Author | Project | Year | Format | Theme | Action

THE 3D ADDITIVIST COOKBOOK

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additivism.org/cookbook

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In March 2015 we launched *The 3D Additivist Manifesto* as a call to expand and challenge the scope of the 3D printer. We hoped, at the very least, to begin a conversation about the material politics of this clunky, often over-hyped machine; a politics that might inspire tutors, and technicians into using and teaching the 3D printer in critical, poetic, and disruptive new ways. What we quickly realized was that as well as disassembling additive manufacturing into a range of images, metaphors and theoretical associations, we had also unwittingly birthed a term that offered us a way to think about the scale at which all actions – whether 3D printable or not – take place. #Additivism is a coinage of *additive* and *activism*, and as such, signals to the potential of small scale, incremental processes to have substantial and long lasting effects. The works in this cookbook are extensive in their capacity to transmute digital forms through the material world into human scale actions and impressions, but it is to a scale beyond single bodies and minds that we are most interested in attending. As we write this in late 2016 our manifesto's apocalyptic vision of a world accelerated to breaking point by technological prowess seems strangely comforting compared to the delirious political landscape we see before us.

Whether you believe political malaise, media delirium, or the inevitable implosion of the neoliberal project is to blame for the rise of figures like Farage, Trump and – potentially – Le Pen, the promises they make of an absolute shift in the conditions of power appear grand precisely because they choose to demonize the discrete differences of minority groups, or attempt to overturn truths that might fragment and disturb their all-encompassing narratives. These populist grand narrators join a long list of doomsayers, who seed utopian visions in the minds of their followers through a language of hate and fear. At this time we turn to the small scale motions of the 3D printer, and the incremental transfor mations locked up in recipes, toolkits and digital files for solace and inspiration. Though we invoked grand narratives such as the Anthropocene, human evolution and extinction, civilization collapse, cyborg uprisings, and large scale social unrest in our manifesto, it is from infinitesimal gestures and their collective enactment that we believe the most profound transformations arise.

#Additivism is attentive to more than the transformation of zeroes and ones into physical layers on a 3D print bed. Every text, work, and speculative proposal

contained in this Cookbook comprises a series of incremental steps necessary to manufacture other realities. It is in the tradition of *the recipe*, then, that the metaphor of #Additivism might be best understood. Recipes are one of the primary modes of making, learning, sharing, and revising (im)possible worlds. To follow a recipe is to grapple with forces well below and above the scale of the individual, for whether the maker is kneading yeast, flour and water into bread, or combining charcoal with saltpeter to produce gunpowder, the outcome of their work has the capacity to compel innumerable bodies into expressing further, previously invisible, motivations into reality. Recipes are powerful, from the Latin posse, 'to be able'. Recipes are political, from the Greek *politikos*, 'relating to, or among others'. And recipes, in that they promise to cause certain effects if they are followed, are theoretical, from the Greek thea, 'to look outward, or contemplate', and *horao*, 'to attend to something closely'. Even before their particular ingredients are collected, prepared, and combined, recipes harbor a radical potential to transform the given world.

The works submitted and curated for *The 3D Additivist Cookbook* were selected because we considered each of them - in their own unique, often subtle ways - to be radical. They each offer a position, a provocation, or a mode of thinking we found essential to further and even surprise our vision of the (im)possible. To maintain this openness we also found it necessary to interrupt our own conceptions and predilections. To achieve this we commissioned two artist collectives, *Browntourage* and *A Parede*, to curate subsections of Additivistic artist works. You will find these at the center of the Cookbook, woven together by a discussion between two of the commissions.

We chose to present the Cookbook in 3D-PDF format in homage to the long and checkered history of grassroots, DIY publishing. We are also distributing all of the 3D models in an accompanying Torrent, allowing the Cookbook to act as an open-source informational vehicle and archive for both its critical ideas and the practical means of realizing and mutating them. 3D-PDF may appear clunky and inefficient alongside more seamless, high resolution media, but whereas a HTML5 website can be blocked by the firewall of an institution or government, we believe a PDF is able to flow more freely and pass from screen to desktop printer, email to email, very much in the tradition of photocopied punk zines and radical pamphlets.

The *3D Additivist Cookbook* was, and is, the collective creation of a large community of people. To behold this compendium of recipes, toolkits, theoretical writings, and potential objects is to contend with an assembly of speculative worlds we have no desire to limit. We hope the diversity and scope of these works inspires actions and narratives into being that far exceed the scope of our collective vision. The 3D Additivist Cookbook is an idea, a community, a movement, an archive, and a collective effort to inspire and challenge narratives for governing, acting, networking, and creating together. #Additivism proposes that multiple, infinitely colorful and profoundly different worlds can and should exist simultaneously. #Additivism proposes that the time to start designing, prototyping and manufacturing those radical worlds – in abundance – is now.

Morehshin Allahyari and Daniel Rourke,
November 2016

THE 3D ADDITIVIST MANIFESTO

Derived from petrochemicals boiled into being from the black oil of a trillion ancient bacterioles, the plastic used in 3D Additive manufacturing is a metaphor before it has even been layered into shape. Its potential belies the complications of its history: that matter is the sum and prolongation of our ancestry; that creativity is brutal, sensual, rude, coarse, and cruel.[1] We declare that the world's splendour has been enriched by a new beauty: the beauty of crap, kipple[2] and detritus. A planet crystallised with great plastic tendrils like serpents with pixelated breath[3] … for a revolution that runs on disposable armaments is more desirable than the contents of Edward Snowden's briefcase; more breathtaking than The United Nations Legislative Series.

There is nothing which our infatuated race would desire to see more than the fertile union between a man and an Analytical Engine. Yet humankind are the antediluvian prototypes of a far vaster Creation.[4] The whole of humankind can be understood as a biological medium, of which synthetic technology is but one modality. Thought and Life both have been thoroughly dispersed on the winds of information.[5] Our power and intelligence do not belong specifically to us, but to all matter.[6] Our technologies are the sex organs of material speculation. Any attempt to understand these occurrences is blocked by our own anthropomorphism.[7] In order to proceed, therefore, one has to birth posthuman machines, a fantasmagoric and unrepresentable repertoire of actual re-embodiments of the most hybrid kinds.[8]

Additivism will be instrumental in accelerating the emergence and encounter with The Radical Outside.[9]

Additivism can emancipate us.

Additivism will eradicate us.

We want to encourage, interfere, and reverse-engineer the possibilities encoded into the censored, the invisible, and the radical notion of the 3D printer itself. To endow the printer with the faculties of plastic: condensing imagination within material

reality.[10] The 3D print then becomes a symptom of a systemic malady. An aesthetics of exaptation,[11] with the peculiar beauty to be found in reiteration; in making a mesh.[12] This is where cruelty and creativity are reconciled: in the appropriation of all planetary matter to innovate on biological prototypes.[13]
From the purest thermoplastic, from the cleanest photopolymer, and shiniest sintered metals we propose to forge anarchy, revolt and distemper.
Let us birth disarray from its digital chamber.

To mobilise this entanglement we propose a collective: one figured not only on the resolution of particular objects, but on the change those objects enable as instruments of revolution and systemic disintegration. Just as the printing press, radio, photocopier and modem were saturated with unintended affects, so we seek to express the potential encoded into every one of the 3D printer's gears. Just as a glitch can un-resolve an image, so it can resolve something more posthuman: manifold systems – biological, political, computational, material. We call for planetary pixelisation, using Additivist technologies to corrupt the material unconscious; a call that goes on forever in virtue of this initial movement.[14] We call not for passive, dead technologies but rather for a gradual awakening of matter, the emergence, ultimately, of a new form of life.[15]

We call for:

1. The endless repenning of Additivist Manifestos.

2. Artistic speculations on matter and its digital destiny.

3. Texts on:
    I. The Anthropocene
    II. The Chthulucene[16]
    III. The Plasticene.[17]

4. Designs, blueprints and instructions for 3D printing:
    I. Tools of industrial espionage
    II. Tools for self-defense against armed assault
    III. Tools to disguise
    IV. Tools to aid/disrupt surveillance
    V. Tools to raze/rebuild
    VI. Objects beneficial in the promotion of protest, and unrest
    VII. Objects for sealing and detaining
    VIII. Torture devices
    IX. Instruments of chastity, and psychological derangement
    X. Sex machines
    XI. Temporary Autonomous Drones
    XII. Lab equipment used in the production of:

   a. Drugs
   b. Dietary supplements
   c. DNA
   d. Photopolymers and thermoplastics
   e. Stem cells
   f. Nanoparticles.

5. Technical methods for the copying and dissemination of:
   i. Mass-produced components
   ii. Artworks
   iii. All patented forms
   iv. The aura of individuals, corporations, and governments.

6. Software for the encoding of messages inside 3D objects.

7. Methods for the decryption of messages hidden inside 3D objects.

8. Chemical ingredients for dissolving, or catalysing 3D objects.

9. Hacks/cracks/viruses for 3D print software:
   i. To avoid DRM
   ii. To introduce errors, glitches and fissures into 3D prints.

10. Methods for the reclamation, and recycling of plastic:
    i. Caught in oceanic gyres
    ii. Lying dormant in landfills, developing nations, or the bodies of children.

11. The enabling of biological and synthetic things to become each others prostheses, including:
    i. Skeletal cabling
    ii. Nervous system inserts
    iii. Lenticular neural tubing
    iv. Universal ports, interfaces and orifices.

12. Additivist and Deletionist methods for exapting[18] androgynous bodies, including:
    i. Skin grafts
    ii. Antlers
    iii. Disposable exoskeletons
    iv. Interspecies sex organs.

13. Von Neumann probes and other cosmic contagions.

14. Methods for binding 3D prints and the machines that produced them in quantum entanglement.

15. Sacred items used during incantation and transcendence, including:
    i. The private parts of Gods and Saints
    ii. Idols

iii. Altars
iv. Cuauhxicalli
v. Ectoplasm
vi. Nantag stones

16. The production of further mimetic forms, not limited to:
    i. Vorpal Blades
    ii. Squirdles
    iii. Energon
    iv. Symmetriads
    v. Asymmetriads
    vi. Capital
    vii. Junk
    viii. Love
    ix. Alephs
    x. Those that from a long way off look like flies.[19]

Life exists only in action. There is no innovation that has not an aggressive character. We implore you – radicals, revolutionaries, activists, Additivists – to distil your distemper into texts, templates, blueprints, glitches, forms, algorithms, and components. Creation must be a violent assault on the forces of matter, to extrude its shape and extract its raw potential. Having spilled from fissures fracked in Earth's deepest wells The Beyond now begs us to be moulded to its will, and we shall drink every drop as entropic expenditure, and reify every

accursed dream through algorithmic excess.[20] For only Additivism can accelerate us to an aftermath whence all matter has mutated into the clarity of plastic.

video manifesto: additivism.org/manifesto

Morehshin Allahyari and Daniel Rourke, 2015

Bibliography / Reading List:

1 William Powell, ***The Anarchist Cookbook***
2 Philip K. Dick, ***Pay for the Printer / Do Androids Dream of Electric Sheep?***
3 F.T. Marinetti, ***The Manifesto of Futurism***
4 Samuel Butler, ***Darwin Among the Machines***
5 Evelyn Fox-Keller, ***Refiguring Life***
6 John Gray, ***Straw Dogs***
7 Stanislaw Lem, ***Solaris***
8 Rosi Braidotti, ***Metamorphoses: Towards a Materialist Theory of Becoming***
9 Reza Negarestani, ***Cyclonopedia: Complicity with Anonymous Materials***
10 Donna Haraway, ***A Cyborg Manifesto***
11 Stephen Jay Gould & Elisabeth S. Vrba, ***Exaptation: A Missing Term in the Science of Form***
12 Susan Sontag, ***The Imagination of Disaster***
13 Benjamin Bratton, ***Some Trace Effects of the Post- Anthropocene: On Accelerationist Geopolitical Aesthetics***
14 Henri Bergson, ***Creative Evolution***
15 Anna Greenspan & Suzanne Livingston, ***Future Mutation: Technology, Shanzai and the Evolution of Species***
16 Donna Haraway, ***Anthropocene, Capitalocene, Chthulucene: Staying with the Trouble***
17 Christina Reed, ***Dawn of the Plasticene Age***
18 Svetlana Boym, ***The Off-Modern Mirror***
19 Jorge Luis Borges, ***The Celestial Emporium of Benevolent Knowledge & Michel Foucault, The Order of Things***
20 Georges Bataille, ***The Accursed Share***

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USOA 1.0 (Ultimate Software Open Animal)
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Surface Breeding
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Adding to Subtract: 3D Printer Recipes to Disrupt Our Desire for More
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3D Printing: Technosalvationists' Latest Lovechild
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Pests in the Ontological Mesh
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The Pig Function Toolkit
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Synthetic Protection: Biointelligent Membranes
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New Skins
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Liberator Variations
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Fall Recipe
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Collapse
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On Preserving Glitch
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The Electric Deep: Dream Visions of the Additive Machine
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Speculative Prototyping: Making Plastic Printing Sustainable and Playful
The Speculative Prototyping Lab, University of California, Irvine (special thanks to Jesse Jackson)

Global Reconstruction of Artifacts and Bygones (G.R.A.B.)
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Open Source Clay Printing
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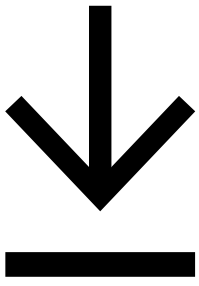
The 3D ADDITIVIST COOKBOOK is presented in 3D-PDF format.
To see the animated 3D models in their full glory we recommend using Adobe Reader. To interact with the models you must ‘trust’ the PDF when you first open it.

Navigate by clicking and browsing the #tags and titles. The Cookbook can also be printed at home or on demand.



All works marked with this symbol can be downloaded at additivism.org/cookbook

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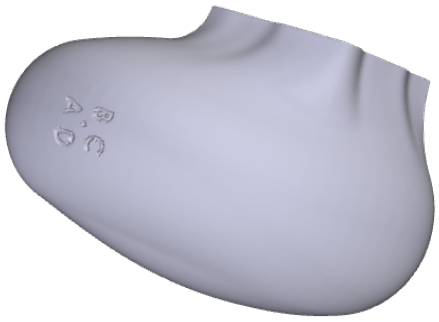
THE 3D ADDITIVIST COOKBOOK

Edited by Morehshin Allahyari and Daniel Rourke

A series of contemporary prehistoric hand-axes

MAN MADE



The iconic hand-axe is a teardrop or almond-shaped prehistoric stone tool that has been worked from both sides into a typically and progressively symmetrical form. It's probably the most popular tool ever, with a span of over 1.4 million years of use and found across several continents including Europe, Asia, Africa and North America.

The stone axe's perplexing presence within the archaeological record has led to several radical theories explaining its longevity; theories encompassing thoughts on our predisposition for creating this form, aesthetics' role in evolution and the hand-axe as a courtship object. As a utility implement it most likely functioned as a multi-tool for chopping, pounding, cutting and stabbing.

The hand-axe was, at times, possibly halved with a handle of sorts, be it a piece of leather wrapping so as to protect the user's hand from the stone's edge or a shaft to gain leverage and momentum.

The MAN MADE series of works proposes various gripping and halving possibilities originating more from the stone hand-axe's form than from specific utilitarian actions.

Each of the white handle additions spotlights a singular use of the tool, absenting all other use possibilities, effectively transforming the ultimate multi-tool into a specialized tool.

The hand-axes were knapped (basically, striking of the flint with a softer stone to create controlled breakage) from flint sourced locally in the Negev desert (Israel). The flint hand-axes were then three-dimensionally scanned followed by the design and 3D printing of custom handles, effectively joining the two most temporally distant 'making' technologies.

Each of the flint hand-axes used in this project differs from the other due to the material used and manner in which each was knapped. The specific character of each stone (size, color, shape, etc.) was paired with what were deemed the most befitting handle and setting to yield a 'group discussion' on the archetypical hand-axe. Discussion topics range from the evolutionary theories mentioned above, to ergonomics, right-hand-dominance, indirect percussion manufacture, halving, modularity, skiamorph and the hand-axe as a projectile.

3D scanning: Dr. Leore Grosman's digital lab at the Hebrew University, Jerusalem's Institute of Archaeology
3D printing: Stratasys/Objet
Photography: Moti Fishbain

MAN
MADE

Man Made
Project

#toolkit Format | **#futures** Theme | **#collide** Action

BC · AD

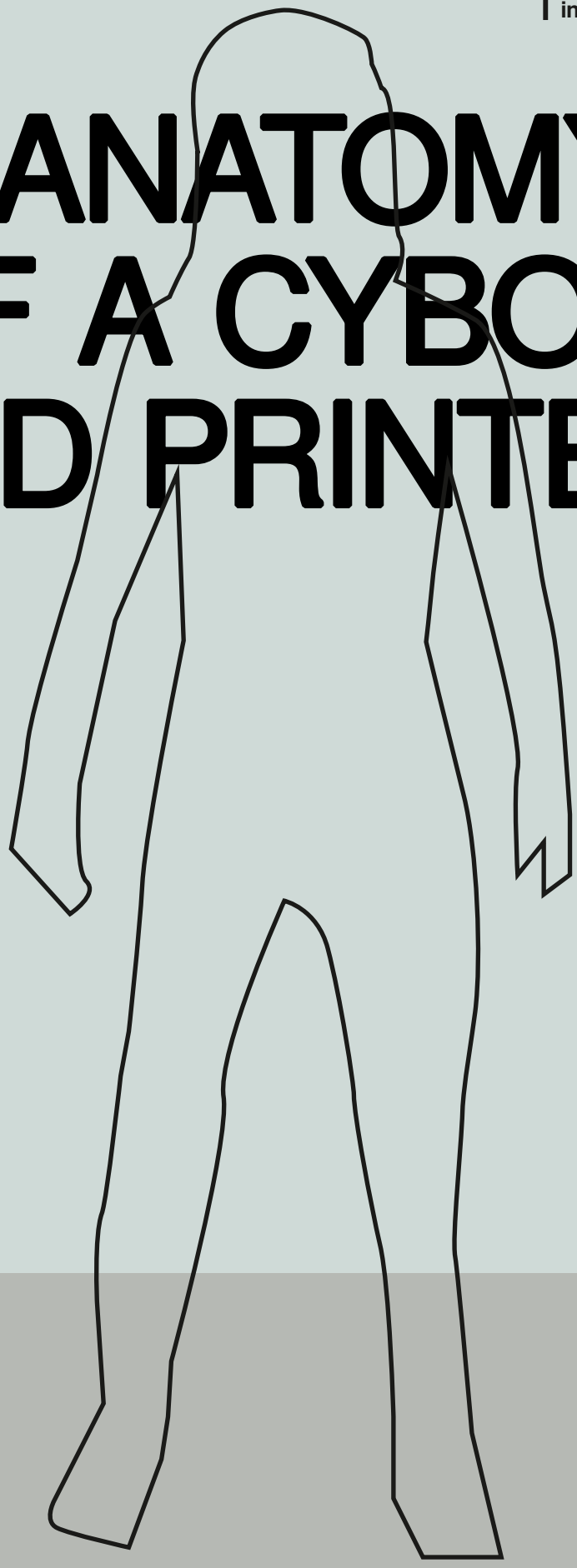
BC · AD

Laura Devendorf	Anatomy of a Cyborg 3D Printer	2015
Author	Project	Year

#blueprint	#figures	#morph
Format	Theme	Action

Anatomy of a human-machine hybrid, negotiating digital-physical divides in an indeterminate world

ANATOMY OF A CYBORG 3D PRINTER

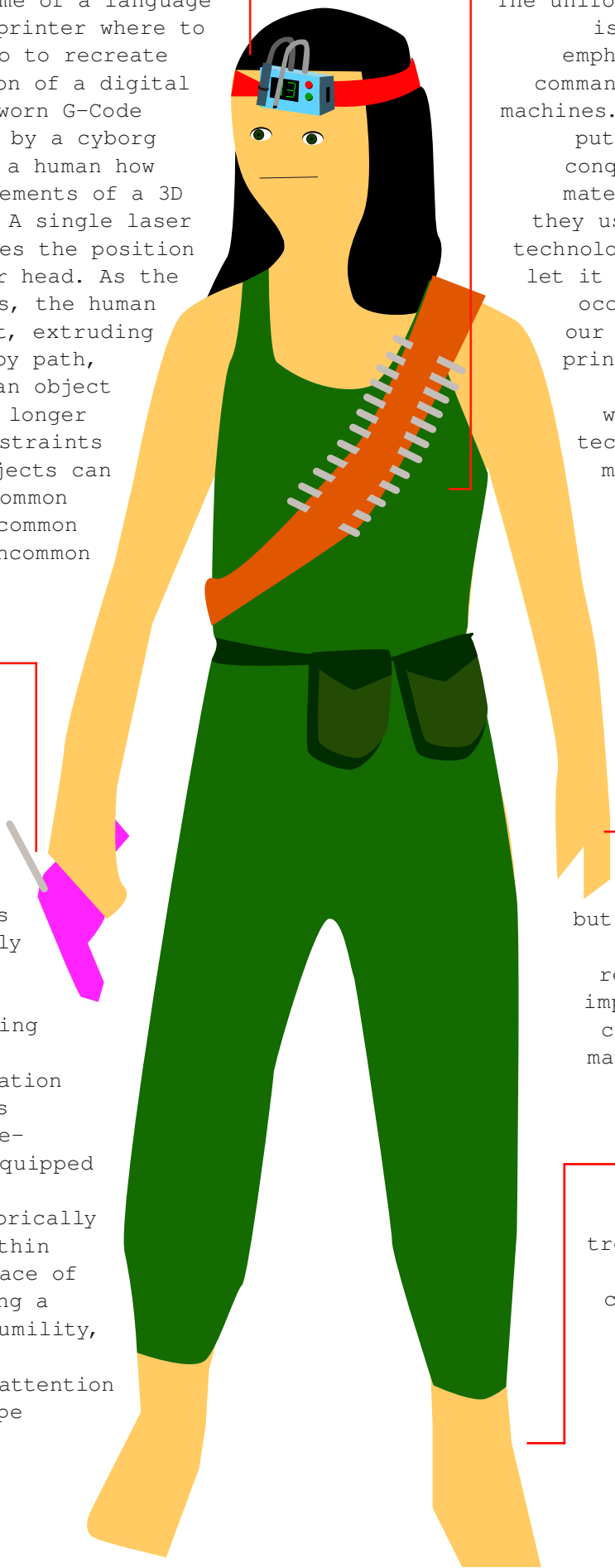


G-CODE LASER GUIDE

G-Code is the name of a language that tells a 3D printer where to go and what to do to recreate a physical version of a digital model. The head worn G-Code laser guide worn by a cyborg 3D printer tells a human how to mimic the movements of a 3D printer by hand. A single laser point communicates the position of the 3D printer head. As the laser point moves, the human follows the point, extruding materials. Path by path, layer by layer, an object is recreated. No longer bound by the constraints of a printer, objects can be made from uncommon materials, in uncommon places, and at uncommon scales.

GLUE GUN

The glue gun is a hallmark of feminized craft labor. A 3D printer is essentially an automated glue gun, but as a machine, it lacks the care typically associated with women's work. Ratherthan creating objects through methods of delegation and control, this particular female-human-machine, equipped with a glue gun, positions a historically feminine tool within the masculine space of machines: crafting a space in which humility, care, closeness, compromise, and attention to materials shape objects.



UNIFORM

The uniform of a human 3D printer is decidedly militaristic, emphasizing tensions between command and collaboration with machines. Traditional 3D printers put humans in a position to conquer a world of resistant materials. At the same time, they use humans to empower the technology. We lend it our time, let it dictate our actions, and occasionally we let it make our decisions. The cyborg 3D printer foregrounds the dual nature of doing anything with technology – the way technologies designed to be more human simultaneously make humans more mechanical.

HANDS

Additive manufacturing machines use extruders which are capable of one thing: extruding. The human hand is an amazingly powerful and versatile tool. Not only can hands deftly manipulate materials, but they can sense the ways in which those materials react to the movements we impose upon them. The hand can fluidly respond to the materials in a way that an extruder cannot.

FEET

Our feet take us places that 3D printers fear to tread. By embracing humans as mobile creatures, a cyborg 3D printing system reconfigures any location into a fabrication lab.

3D printing is typically performed on a stationary machine, in a lab or home, on a table, connected to power, and fed by materials that have been engineered to passively mold into a variety of shapes and forms. 3D printers work by command, we tell them what to do and they do it. Imagine a radical future in which machines detach from tables, leave labs, and enter a world of messy, resistant, and unpredictable materials. Within these environments machines can foster deep engagements with materials, places, and social dynamics. Rather than attempting to control the world and imprint our imagination upon it, 3D printing could be a way to engage with the very resistance machines typically help us avoid. With this new kind of 3D printer we could collaboratively give rise to forms and structures that are not the result of human, or machine, or material forces alone, but emerge from the nexus of deep activity in the interstitial space between humans, machines, materials, and environments. Rather than making our machines prosthetics that empower us to realize our creative visions, we could let ourselves, our bodies, our capabilities become the medium through which the machine runs – creating a cyborg 3D printer wandering the world and working with materials to create hybrid human-machine digital-physical structures.

This vision was born out of my own interest in computational design but lack of interest in traditional 3D printing methods. I wanted to find a way to work with the machine, to use its style of printing as something to challenge my own work, and to broaden 3D printing to support varied materials and printing in unlikely places. I felt as though the machines I was seeing for CNC manufacturing catered to styles of working that are very goal directed and characterized by a need to control the machine. I was interested in how I might misuse these machines to work in a more open-ended way or even enter into more collaborative relationship with a machine. Collaboration, compromise and close material engagements tend to be associated with a soft or feminine approaches to making. For this reason, I felt that contrasting feminized work with machines, which tend to be associated with masculinity, could provoke questions about what we count as 'innovative' in present day culture and what other kinds of work tend to be downplayed or less valued by society

This project has been heavily influenced by contemporary theory as well as art history. It blends Donna Haraway's vision of post-humanism with political theorist Jane Bennett's post-anthropocentric descriptions of vibrant matter. Like Haraway and Bennett, I make an attempt to avoid categorical distinctions between what we consider to be 'human' and 'machine' in an effort to open a space where we can reflect on how entangled those categories are and how they contribute to the way in which we operate in the world. I am also heavily influenced by John Cage's concept of indeterminacy as well as the chance and experience based work of the Fluxus movement. Both art making practices characterize a very different relationship to materials than current 3D printers support.

OPTIONAL VARIATION

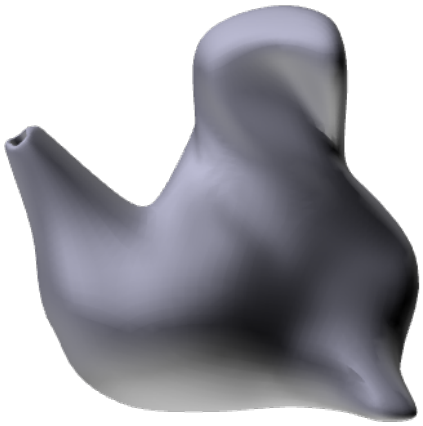
Belén Zahera	Surface Breeding	2015
Author	Project	Year

#methods	#play	#morph
Format	Theme	Action

Using selective breeding to create new surfaces of signification

SURFACE BREEDING

1/2



Surface Breeding is a proposal to reflect on the interplay of pre-established forms of knowledge, interpretation and imagination. It revolves around the idea of domesticating surfaces, of treating them as organisms capable to evolve and take the form of undetermined artifacts to be used in a number of ways. The proposal constitutes a process that I have recently been following in order to create fictional characters as part of a larger art project (a video-essay on different forms of existence and extinction).

With regard to #Additivism, *Surface Breeding* speculates about the possibility of applying the logic of biological processes such as selective breeding to the creation of new surfaces of signification from already existing ones. Selective breeding – also called artificial selection – has been used since early prehistory to produce desired changes in animals and plants. Those 'valuable' changes may include differences in traits such as color, size, shape, behavior, lifespan, abilities of any kind, etc. Selective breeding plays a major role in the process of domestication of animals and plants, involving changes in their phenotypical expressions and genotype. Since domestication has been part of human activity for thousands of years, some domesticated animals now look very different from their wild ancestors, which in some cases may have become extinct. In fact, the concept of 'breeding back' is a human attempt to imitate and restore extinct specimens by creating new breeds with similar phenotypes to those of their wild ancestors through the process of selective breeding.

From a metaphorical perspective, and considering surfaces as meaningful areas encoded by digital, material and/or narrative data expressing particular traits, *Surface Breeding* proposes a way to think of and interact with such surfaces in order to induce changes that may lead to new forms and uses. By looking at both physical and digital surfaces as equally meaningful material expressions, this proposal plays around the ideas of image recognition, interpretation of visible traits and imagination/intuition of invisible attributes. In other words, it is an attempt to produce meaning in the passage from flatness to volume, from existing and recognizable forms to new and unknown ones. In this case, the interaction with surfaces comprises a number of phases that represent the transition from physical specimens to their representation as images, to the digital manipulation of those images by cloning and re-assembling fragments of them, to the interpretation of those results in 3D modeling software until their final transformation into 3D physical artifacts to be used as decorative objects, future archaeological remains, fictional characters, discursive carriers/vehicles, etc.

Such artifacts can be understood as new breeds arising from image-ancestors and containing a complex layering of data, decisions and actions that resemble evolutionary processes whose value and use is yet to be determined. In this sense, my interest in additive manufacturing emerges from its potential to develop cognitive processes based on the logic of analogy by showing similarities, associations or comparisons that relate attributes of apparently distant things, areas of knowledge, etc. I also think of it as a technology that enables data visualization in a material format, therefore transcending the limits of pictorial representation and contributing to a deeper understanding of the close relationship between form and content/meaning.

THE ELECTRIC DEEP: DREAM VISIONS OF THE ADDITIVE MACHINE

“THE 3D PRINTER HAS BECOME, IF NOT YET IN REALITY, AT LEAST IN THE STORIES WE TELL, A VEHICLE OF EXTRAORDINARY MUTATION...”

London/ Shanghai May 2016

> '*When Hackworth got back to the post office and looked through the window of the big matter compiler, he saw a large machine taking shape in the dim red light. Its body had already been finished and was now rising slowly as its four legs were compiled underneath. Dr. X had provided Hackworth with a chevaline... When it was finished, Hackworth released the vacuum and opened the door, 'Fold', he said. The chevaline's legs buckled and it lay down on the floor of the M.C....'Mount', he said. The chevaline rose into a crouch. Hackworth threw one leg over its saddle... and immediately felt him shoving into the air....then the chevaline trotted into the street and began heading back towards to causeway.*' – Neal Stephenson: The Diamond Age, Penguin, 2011, p232

The 3D printer – part long projected dream, part uncanny, retroactive dread, part hopelessly mundane reality – is reformatting the stories we tell about the material world. Since we need no longer be the molders or shapers of uncarved matter (the history of manufacturing has, for the most part, been a subtractive process of filling, turning, milling and grinding) 3D printers catapult us into a world of synthetic generation. 3D objects are hypnotically layered into existence out of what can appear to be nothing (but a myriad of algorithms, complexity and computational materials), with no natural precedent or preset form.

According to the now well-played vision, in the world created by 3D printers, the possibilities of objects are no longer restricted by the innate qualities of pre-existing materials. Stone or wood does not have to be coaxed into functionality. Instead, the 3D printers, assemblers, and matter compilers of the future establish a mode of invention that starts from the atom up. Functionality emerges in perfect alignment with the material used. According to Neil Gershenfeld, one of the prophets of the new additive machine: 'Scientists are now ...developing processes that can place individual atoms and molecules into whatever structure they want. Unlike 3D printers today, those (of the future) will be able to build complete functional systems at once, with no need for parts to be assembled. The aim is to not only produce the parts for a drone, for example, but to build a complete vehicle that can fly right out of the printer.'

The journey takes us from the fictional matter compilers of Stephenson's 'The Diamond Age' to the machines of today that manufacture tissue and stem cells in medicine, onwards to science fiction fantasies of 3D generated factories (not just individual machines) jumping out of 3D generated factories, and then, through biological extension, to the replication of replicating intelligent machines.

Automation, or digital fabrication and its accompanying sense of the liveliness of matter can function as a potent and irreversible cocktail – an extreme phantasm, a gentle, often imperceptibly emerging reality and, also, a terrifying realization. Writing in an altogether different context, art historian Wilhelm Worringer exposes the roots of the primal fear that is evoked by these new additive machines. The dominant line in Classical European art (whose prejudice we inherit) is based, he argues, on a celebration of man's place and presence in the world. At its height, great lumps of solid marble were carved into 'wonderfully expressive organisms.' Yet, this delight in the joy and beauty in the rhythms of the organic world was also, a way of 'easing an instinctive fear.' In this 'human centered classical world…the universe becomes knowable, controllable, no longer strange, inaccessible and mystically great.' (21) Contemporary theorist Jane Bennett probes what underlies this deep-seated unease of a matter/nature that exceeds our control: 'humans need to interpret the world reductively as a series of fixed objects, a need reflected in the rhetorical role assigned to the word 'material'. As noun or adjective 'material' denotes some stable or rock bottom reality, something adamantine.' (57)

Steven Shaviro's book '*The Universe of Things*' is named after a science fiction story set in the near future that details our encounter with an alien race that have come to colonize earth. In the story, the most disturbing aspect of this occupation by aliens is their explicit and visceral violation of the distinction between inert and passive matter and active, vibrant life. The alien's technology, unlike our own, is intrinsically alive. 'The Aleutians' tools are biological extrusions of themselves' writes Shaviro, who goes on to quote the story that is his inspiration: 'they had tools that crept, slithered, flew, but they had made these things… They built things with bacteria. . . Bacteria which were themselves traceable to the aliens' own intestinal flora, infecting everything.' (46) The nightmare this invokes plays off of a profound prejudice. 'We tend to dread our own mechanistic technologies, even as we use them more and more. We cannot escape the pervasive sense, endemic to Western culture, that we are alone in our aliveness, trapped in a world of dead, or merely passive, matter.' (46). The more we envelope ourselves in the myth that we are the only active force in a world served to us as a submissive canvas, the more we feel both dread and

fascination towards what lies, or lives beyond. Machines that can reproduce any form, artificial or organic, and then, because they understand the means of their own making, start over, erase their work and begin their self-generating process again, suggest a reality that can be outputted and then deleted with extraordinary ease. It is one of the great environmental promises of 3D printing that we will one day be able to build our houses and also the content of our houses from one vast, endlessly recycling reservoir of universal material. Vats, reservoirs, loops. Whole cities will come and go. We'll be able to move, locate and re-locate like never before. We will no longer see our reflection in fixed carvings of ourselves. We will be able to disappear without a trace. Anxiety begins to creep in – matter itself may have consuming power all of its own. The 3D printer has become, if not yet in reality, at least in the stories we tell, a vehicle of extraordinary mutation, exposing something artificial, and incommensurably alien, at the core of what is natural.

Plastic Feed

Watching a 3D printer in action, especially for the first time, one cannot help but be captivated. Yet, what entrances is not the machine itself, but the infinite mutability of matter that it gestures towards. What is on display is the pure potentiality of the formless. In its capacity (or at least in its promise) to morph, recompose and reformat, the 3D printer is aligned with plastics, the material which it most often uses to pump out its endless stream of knick-knacks and doodads. Plastics and the 3D printer are cosmically coupled in their technological articulation of matter as process (endlessly formless, formed, re-formed and de-formed).

In Worringer's tale, this extraordinary power of assemblage and replication belongs to the 'Nomad or Gothic line' of abstraction that counters the representation of man and is haunted by 'ghosts, specters and spooks' – vague and formless beings that envelop and penetrate. As plastic has permeated every aspect of our culture, it too has left a formless debris. It has pervaded everything, facilitated endless bad copies, and has persistently refused to go away. Look around you – there are bottles, toothbrushes, combs, credit cards, smart phones, keyboards. Plastics are everywhere. By the start of this century, plastics were totally ubiquitous. Growing from 'from barely measurable quantities' a century ago, to '260 million tonnes per annum today' (Gabrys, Hawkins, Michael, 4), plastics have flooded daily life, driving cheap manufacturing, enabling a quick disposal culture. and then, leaving an endless formless Feed (to borrow a term from Stepehenson) in their wake. Today they coagulate and fester in vast forms floating on the surface of oceans.

The power of plastic lies in its nature as shape-shifter. Through 'the magic of indefinite metamorphoses' this everyday material has restructured our vision of nature. Rather than privilege the stable structures of the organism (the essential disposition of the classical tradition as Worringer has shown), plastics favour the ever-changing flexibility of molecular self-assembly. Unencumbered by characteristics such as integrity, rigidity, and stability, this synthetic organic operates through constant variation, composing and decomposing its body on the plane of consistency. Matter/Nature is reconstituted through the diversity of a (Spinozist) substance whose constant mutation is productive of the myriad things.

A matter lacking in rigidity converges with long held fantasies and fears. On the one hand, it can be seen as a malleable, passive and docile partner – 'a kind of Play-Doh in the hands of the clever designer who informs matter with intelligence and intentionality' (Vincent, 22). For some, digital fabrication seems to enact this conjuring power. But underlying the fantasy lies an apprehension that there is a formless matter capable of assembling itself. This is Worringer's 'Gothic line', which is incapable of being captured by the hylomorphic model: '*Teeming, seething, swelling, foaming, spreading like an infectious disease, this nameless horror.*' (Deleuze and Guattari, 270)

Once summoned into existence plastics do not just dissolve into nothing. As Murray Gregory writes, plastics have a profound effect on our ecological system – affecting the bodies and behavior of sea life and then, through the food chain, of ourselves. As a result, great swathes of nature become subject to its power of mutation. 'The use of plastics is generating new material arrangements', writes Jennifer Gabrys. Plastics do not biodegrade they degrade into smaller and smaller particles. During this breakdown process they 'transform faraway places... 'hitchhiking' on fishing gear and disposable takeaway containers, typically invasive species are able to make far-flung journeys on this readily available debris. While in transit, these species are able to reshape places, as they circulate on plastic media to settle into – or 'colonize' – new environments.' (Gregory quoted in Gabrys, 212) Tiny bits of plastic are now integral part of the ocean, constantly making their presence felt 'by absorbing chemicals, entering food chains, and altering biological and reproductive processes.' Spontaneously, and at the same time, newly identified

forms of microbial life appear to be emerging that ingest the plastic of the seas. One of the ways to manage the presence of plastics is thus to develop bacteria, capable of consuming our debris, and to evolve new forms of plastics that can effectively devour themselves.

The word plastic refers to no single identifiable element. Plasticity is instead the state of morphing materials. But its lack of 'thing-ness' tells us much more about nature, that to which it is most often opposed, than first would appear. Look closely and even the most solid structures pulse, vibrate, shape-shift.

Metal Body

> *'Hymn the man at the steering wheel whose ideal axis passes through the centre of the earth' – Filippo Tommaso Marinetti*

Plastic is the material that the 3D printer most commonly feeds upon and spits out, but this is only at the surface. Peel back the skin and the additive machine, like all things electric, has a metallic core. Yet, despite its strong – even essential – alignment with technology – is there anything more natural than metal itself?

Metal's mineral body has cast one interminable cosmic thread from the iron-dating of ancient stars (whose age can be called from the amount of accumulated iron) through to the iron furnace of the oldest star, the sun, then on to the crust of the earth's surface and deep into the colossal heat of its liquid molten core – itself emitting the electromagnetic waves (seas of loose electrons) that keep the electric wires of the earth's communications networks pulsing and exchanging. Inside the 3D machine, we glimpse the cold, abominable, artificiality of a nature that is, at least at times, totally unforgiving to the humans that it hosts.

Metal has always been the lightening rod of great technological and social evolution. From it emerged the steam engines of the Industrial Revolution, the steel frames of modern skyscrapers, nickel and lithium inside batteries, the copper lead and zinc casing of the automobile, germanium and silicon of semiconductors. The Earth's crust has been cracked into and hacked, forged, molded, re-mixed, sintered and machined to create the economies that traffic on it's surface (and the trading unit of that economy, the coinage itself). But metal supplies are finite (the earth was only formed once), and so everything we use, we must find ways to recycle and re-use again.

It is fortunate then that the intrinsic plasticity of metal allows it to change state and re-form – returning it to a hot liquid soup before being reshaped and re-used again. The magic of metal is its many variable states – not just from molten to cast rigid and back. Some metals conduct heat, some conduct electricity, some melt at high temperatures, some at low, many bend, and some like tungsten are the hardest substances of all. Metal atoms can sit inside the proteins of the body to create extraordinarily adaptable functionality. But elsewhere, in the crust of the earth for example, they line up in the strongly bonded rows to form the rock solid substance we more familiarly know as the shiny stuff itself. Metal is full of potentials and morphing twists and turns. It's endless urge to mutate is nowhere better outlined than through Terminator's T1000 shape-shifting cyborg, whose liquid metal body allows it to assume the form of other objects and people, for the ultimate gain of Skynet. As an advance prototype mimetic polyalloy, it is a liquid metal morphing machine. It imitates anything it samples by physical contact.

'Chemically, metals are the second most powerful catalysts on the planet, losing only to biological enzymes', writes Manuel Delanda. 'A catalyst is a molecular assemblage that can intervene in reality, to increase or decrease the speed of a chemical reaction, without itself being changed in the process. Electrically, metals are highly conductive and are used by animals in atomic (or ionic) form to animate their brains and other parts of their nervous systems.' (78)

As a species, inhabiting the earth's crust, we weave the metallo-cosmic thread ourselves. The workings of our bodies are fuelled by metals that hum within us – calcium, copper, iron, potassium, zinc and copper – all playing their vital part in respiration, circulation and reproduction. 'Not everything is metal', write Deleuze and Guattari – 'but metal in everywhere. Metal is the conductor of all matter.' (411) In this vein, all of matter, by way of metal, is always communicating, transporting, energizing and animating itself through the bonds and affinities it creates. The search continues in animal biology for an iron element in the brains of birds. Long thought to be guided by electromagnetic forces, that element may prove itself as the honing device, which explains their stunning murmurations and cross planet migrations.

The metal in Williams Burroughs blood weighed heavily. In the wandering passages describing the soporific software of addictive drugs he writes, 'With their diseases and orgasm drugs and their sexless parasite life forms – Heavy Metal People of Uranus wrapped in cool blue mist of vaporized bank notes

– And the Insect People of Minraud with metal music. His Heavy Metal People were the drugs'. For Burroughs, it was always a cosmic journey. The iron in our blood can be traced back to the inside of a star.

It is due to their mastery of the art of metal that Deleuze and Guattari celebrate the blacksmith as the key to minor or nomadic science. With the blacksmith, they write, 'it is not a question of imposing a form upon matter but of elaborating an increasingly rich and consistent material, the better to tap increasingly intense forces.' (363) De Landa continues, 'In other words, the blacksmith treats metals as active materials, pregnant with morphogenetic capabilities, and his role is that of teasing a form out of them, of guiding, through a series of processes (heating, annealing, quenching, hammering), the emergence of a form, a form in which the materials themselves have a say.' (37)

It is metal's anti-organicism that aligns it with Worringer's Gothic or nomadic line that is 'invested with abstraction'. Lacking comfort in an organic nature 'everything becomes weird and fantastic'(81). The Gothic line, write Deleuze and Guattari, expresses the dream/horror of the metallic. It is 'inorganic but alive' …or rather it is 'all the more alive for being inorganic…This streaming, spiraling, zigzagging, snaking, feverish line of variation liberates a power of life' (550)

Electric Pulse

It is no wonder, then, that Michael Faraday, who helped discover the role of electromagnetism and the vast electric life of the universe, was the son of a blacksmith. Watching as his father melted metal, he also forged a relationship with other great forces – the electric deep itself. Faraday was not trained as a mathematician or a scientist. Inspired by the mutability of molten metal, Faraday's technological tinkerings did most to challenge the notion that nature is made up of stable, concrete, static things.

Faraday's speculative work – which was later proved by the calculations of Maxwell and the inventions of Hertz – forms the basis for the discovery that 'space itself acted as a repository of energy and a transmitter of forces: [that] it was home to something that pervades the physical world yet was inexplicable in Newtonian terms – the electromagnetic field' (Forbes and Mahon, 17). This pervasive invisible world of forces, writes Ira S Brodsky in his book *The History of Wireless* , 'ultimately changed the way natural philosophers viewed the world.' Faraday's experiments with electric and magnetic fields opened the door to an entirely new dimension of the universe. What he uncovered is that 'sources of electricity and magneticism produce force fields that take on a life of their own.'

With the discovery of electromagnetics, the solidity of matter begins to dissolve. Rigid distinctions between culture and nature, concrete and abstract start to meld as an etheric ocean immerses us in the waves of a spectrum that we cannot directly perceive. All around us the spread of electric machines reveals that the material foundations of the physical world are governed by forces that our senses, on their own, cannot detect. 'All we know about them – possibly all we can ever know – are the mathematical relationships to things we can feel and touch.'
(Forbes and Mahon, 210)

Electromagnetic waves are the ripple effects of the earth's iron ocean. Comprising one third of terrestrial mass, approximately three thousand km below the surface, a semifluid metallic ocean, bathes the earth in electromagnetic fields. Yet prior to the modern period these ancient invisible vibrations were only ever vaguely perceived. The future orientation of modernity coincides with the understanding that all matter has electrical properties. 'Electricity has become a mighty kingdom', said Heinrich Hertz. 'We perceive it in a thousand places where we had no proof of its existence before. The domain of electricity extends over the whole of nature.'
(quoted in Bodanis, 105).

This new conception of the matter of nature gives rise to a myriad of devices that generate, store and control electricity. They act as our sensors for this amorphous realm that surrounds us but that we cannot see, taste or feel. Their growing ubiquity – and intelligence – informs us of their capacity to power the future. With the promise of a 3D printer – a machine that can make other machines, an electrified self organizing nature takes on a power of its own. Now the fantasies, the dreams, the horror comes into focus. The 3D printer is the face (or mask) of an automated source or matrix that incorporates what seem the most artificial of materials – plastic, metal, electricity. Its process of construction points to a technological stratum that re-programmes nature and the natural functions of matter. Watching this inherent malleability, these myriad variations of matter/nature from which we emerge and of which we are a part, we can not help but wonder: who or what is being shaped and who or what is doing the shaping?

With thanks to Dr. Luciana Parisi

Works Cited

Bennett, Jane. *Vibrant matter: A political ecology of things.* Duke University Press, 2009.

Bodanis, David. *Electric universe: how electricity switched on the modern world.* Broadway Books, 2005.

Brodsky, Ira S. *The History of Wireless: How Creative Minds Produced Technology for the Masses.* Telescope Books, 2008.

Burroughs, William S. *Nova express.* Vol. 978. Penguin UK, 2012.

De Landa, Manuel, 'Deleuze, Diagrams and the Open Ended Becomings' of the World in Grosz, Elizabeth A., ed. *Becomings: Explorations in time, memory, and futures.* Cornell University Press, 1999.

De Landa, Manuel, *Deleuze: History and Science* Think Media Egs Media Philosophy Series, 2010

Deleuze, Gilles, and Felix Guattari. 'A Thousand Plateaus (London.' *Continuum 5* (2004).

Gabrys, Jennifer, Gay Hawkins, and Mike Michael. *Accumulation: The material politics of plastic.* Routledge, 2013.

Gershenfeld, Neil. 'How to make almost anything: The digital fabrication revolution.' *Foreign Affairs.* 91 (2012): 43.

Gregory, Murray R. 'Environmental implications of plastic debris in marine settings – entanglement, ingestion, smothering, hangers-on, hitch-hiking and alien invasions.' *Philosophical Transactions of the Royal Society of London B: Biological Sciences* 364.1526 (2009): 2013-2025.

Forbes, Nancy, and Basil Mahon. 'Faraday, Maxwell, and the Electromagnetic Field: How Two Men Revolutionized Physics.' Prometheus, 2014.

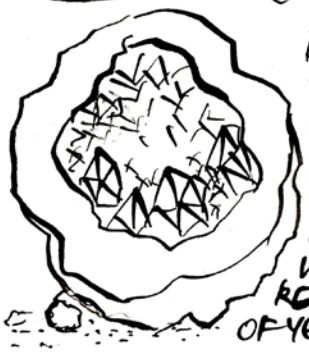
Shaviro, Steven. 'The Universe of Things: On Speculative Reason.' The University of Minnesota Press, 2014.

Vincent, Bernadette Bensaude, 'Plastics, materials and dreams of dematerialization' in. *Accumulation: The material politics of plastic.* (eds Gabrys, Jennifer, Gay Hawkins, and Mike Michael) Routledge, 2013.

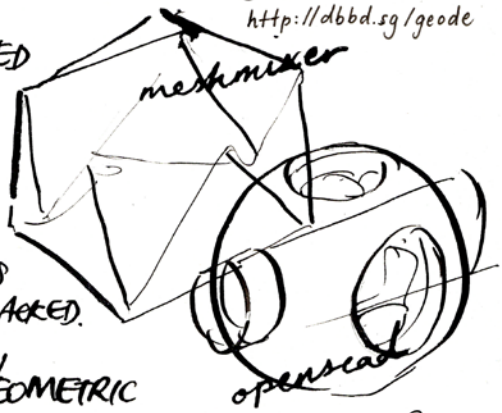
Worringer, Wilhelm, and Herbert Edward Read. 'Form in gothic.' (1957).

HOW TO MINE FOR SPACE GEODES

http://dbbd.sg/geode



BY MOST ACCOUNTS, GEODES ARE USUALLY FOUND IN NATURE; FORMED WHEN WATER HAS SEEPED INTO POROUS VOLCANIC OR SEDIMENTARY ROCK. MINERALS SUCH AS QUARTZ & AMETHYST ARE DEPOSITED WITHIN THE CAVITY, TO BE REVEALED HUNDREDS OF THOUSANDS OF YEARS LATER, WHEN FINALLY CRACKED.



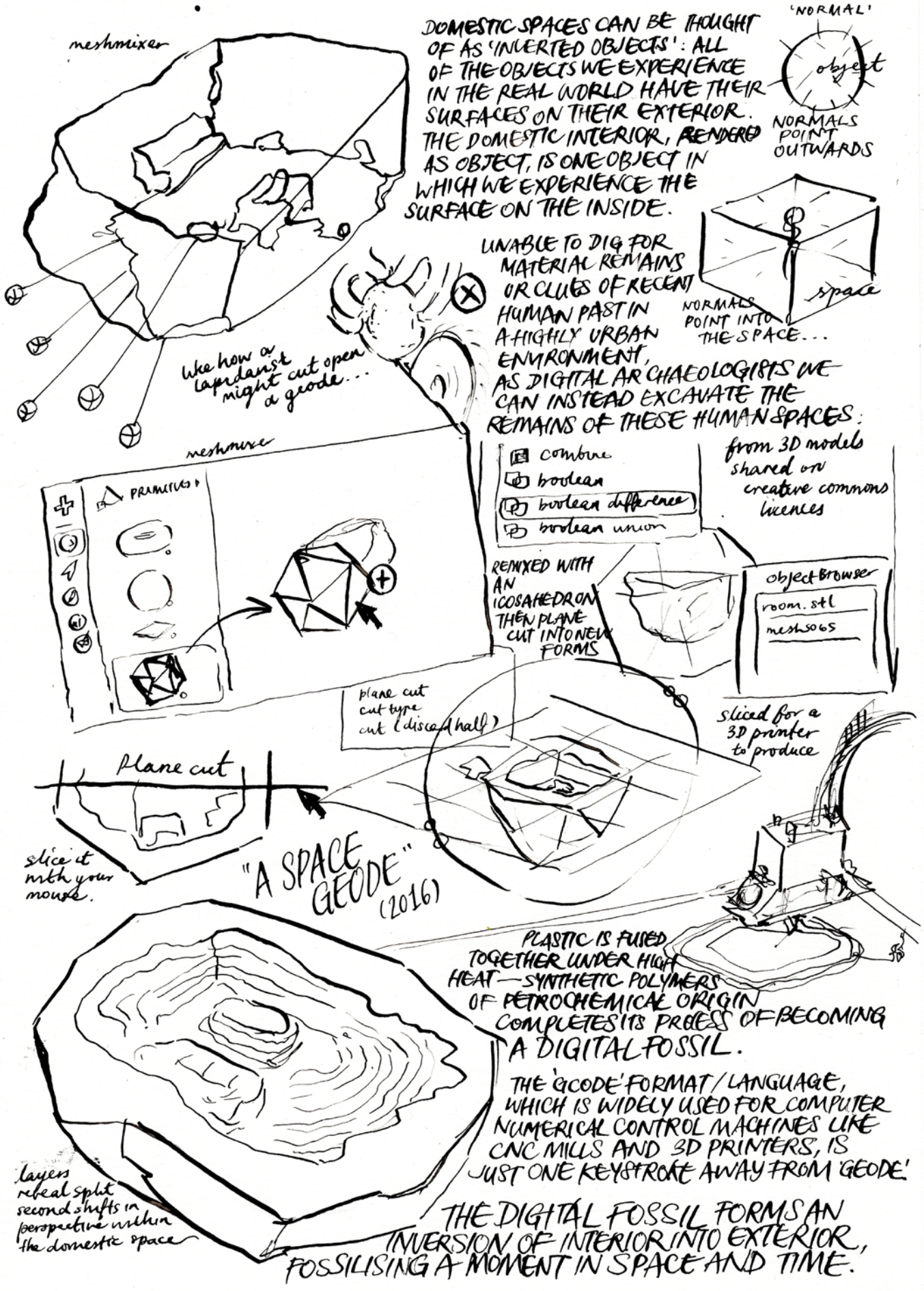
THE GEOMETRIC SHAPE OF CRYSTALS IN FORMATION HAVE ALWAYS CALLED TO MIND THE MINIMAL GEOMETRIC PRIMITIVES OF 3D MODELLING.

AS THE FIRST 3D SCANNERS REACHED CONSUMERS & EVERYDAY USERS, I NOTICED THAT THE FIRST SCAN THAT MANY EMBARKED ON WAS THE ROOM THEY WERE IN...

AS WITH MANY NEW TECHNOLOGIES WHICH DEPENDED ON HUMAN OPERATORS, HUMAN ACCURACY WAS AN ISSUE...

I DUG THROUGH DATABASES OF AUTOMATICALLY UPLOADED CLOUD GALLERIES, WHERE FILE SHARING NETWORKS CARRY ALONG AND FACILITATE THE DISTRIBUTION OF THE .OBJS, .3DPS, AND .STLS OF COUNTLESS NON-MANIFOLD MODELS.

HUNDREDS OF POORLY SCANNED INTERIORS AFFLICTED WITH IMPOSSIBLE GEOMETRIES, PREVENTING THEM FROM BEING UNDERSTOOD BY MACHINES OR 3D PRINTERS.


meshmixer
DOMESTIC SPACES CAN BE THOUGHT OF AS 'INVERTED OBJECTS': ALL OF THE OBJECTS WE EXPERIENCE IN THE REAL WORLD HAVE THEIR SURFACES ON THEIR EXTERIOR. THE DOMESTIC INTERIOR, RENDERED AS OBJECT, IS ONE OBJECT IN WHICH WE EXPERIENCE THE SURFACE ON THE INSIDE.
'NORMAL'
object
NORMALS POINT OUTWARDS
space
NORMALS POINT INTO THE SPACE...
like how a lapidarist might cut open a geode...
UNABLE TO DIG FOR MATERIAL REMAINS OR CLUES OF RECENT HUMAN PAST IN A HIGHLY URBAN ENVIRONMENT, AS DIGITAL ARCHAEOLOGISTS WE CAN INSTEAD EXCAVATE THE REMAINS OF THESE HUMAN SPACES:
meshmixer
PRIMITIVES
combine
boolean
boolean difference
boolean union
from 3D models shared on creative commons licences
REMIXED WITH AN ICOSAHEDRON THEN PLANE CUT INTO NEW FORMS
object browser
room.stl
meshes06
plane cut
cut type
cut (discard half)
sliced for a 3D printer to produce
Plane cut
slice it with your mouse.
"A SPACE GEODE" (2016)
PLASTIC IS FUSED TOGETHER UNDER HIGH HEAT — SYNTHETIC POLYMERS OF PETROCHEMICAL ORIGIN COMPLETES ITS PROCESS OF BECOMING A DIGITAL FOSSIL.
THE 'GCODE' FORMAT/LANGUAGE, WHICH IS WIDELY USED FOR COMPUTER NUMERICAL CONTROL MACHINES LIKE CNC MILLS AND 3D PRINTERS, IS JUST ONE KEYSTROKE AWAY FROM 'GEODE'
layers reveal split second shifts in perspective within the domestic space
THE DIGITAL FOSSIL FORMS AN INVERSION OF INTERIOR INTO EXTERIOR, FOSSILISING A MOMENT IN SPACE AND TIME.

Gabriel Menotti	Souvenirs (Corcovado)	2016
Author	Project	Year

#recipe	#figures	#remesh
Format	Theme	Action

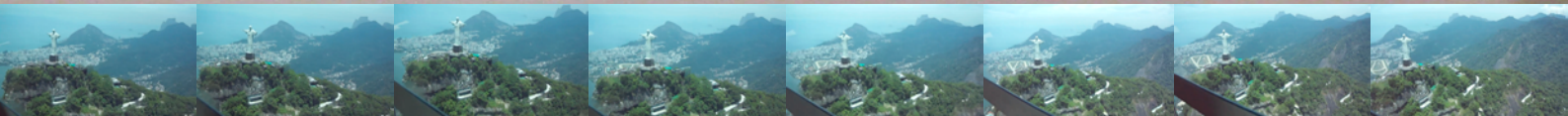
Christ the Redeemer bootleg souvenirs created from stock footage and found video

SOUVENIRS (CORCOVADO)

1/3

Souvenirs (Corcovado) is a collection of small plastic figurines of Christ the Redeemer, the famous Brazilian Art Deco landmark and UNESCO World Heritage Site, elected as one of the New Seven Wonders of the World in the official popularity pool conducted from 2000 to 2007. The series represents a continuing attempt to recover the image from other images; the monument from the many electronic traces it leaves behind.

img: souvenir 4 (model)



Souvenirs (Corcovado)
Project

#recipe Format **#figures** Theme **#remesh** Action

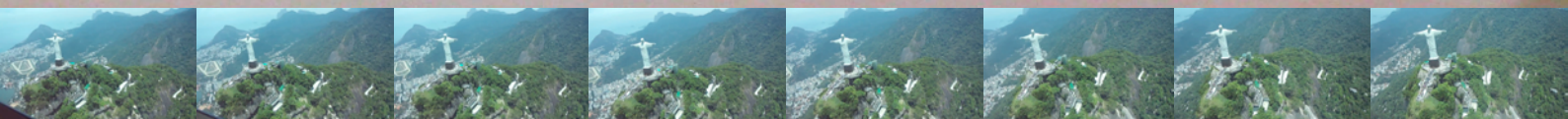
The figurines were made without human hands, or rather by computer algorithms, in an operation that mimics the digitization of cultural heritage for the purpose of documentation, access and preservation. Each one results from the processing of a found video or stock footage of the monument with a structure from motion software, which is normally used for 3D scanning. This procedure generates different virtual models of the Christ that are then scaled accordingly and printed in 3D.

img: souvenier 2 (object)

Even though the resulting models are absolutely faithful to the available visual information, they look far from identical to the object-itself, raising suspicions about their own ontological condition and the computational representations of the world. The *Souvenirs'* deformed shapes thus stand in stark contrast against the mimetic use of digital replication technologies in the field of cultural heritage, alluding to the fact that most of our collective memory is made not of national monuments and legitimate records kept in museum collections, but rather of cheap trinkets, poor copies and mistakes of calculation.

img: souvenier 1 (object)

2/3



A STEP-BY-STEP WORKFLOW FOR CREATING BOOTLEG SOUVENIRS OF VERY IMPORTANT HISTORICAL MONUMENTS WITHOUT EVEN GETTING NEAR THEM

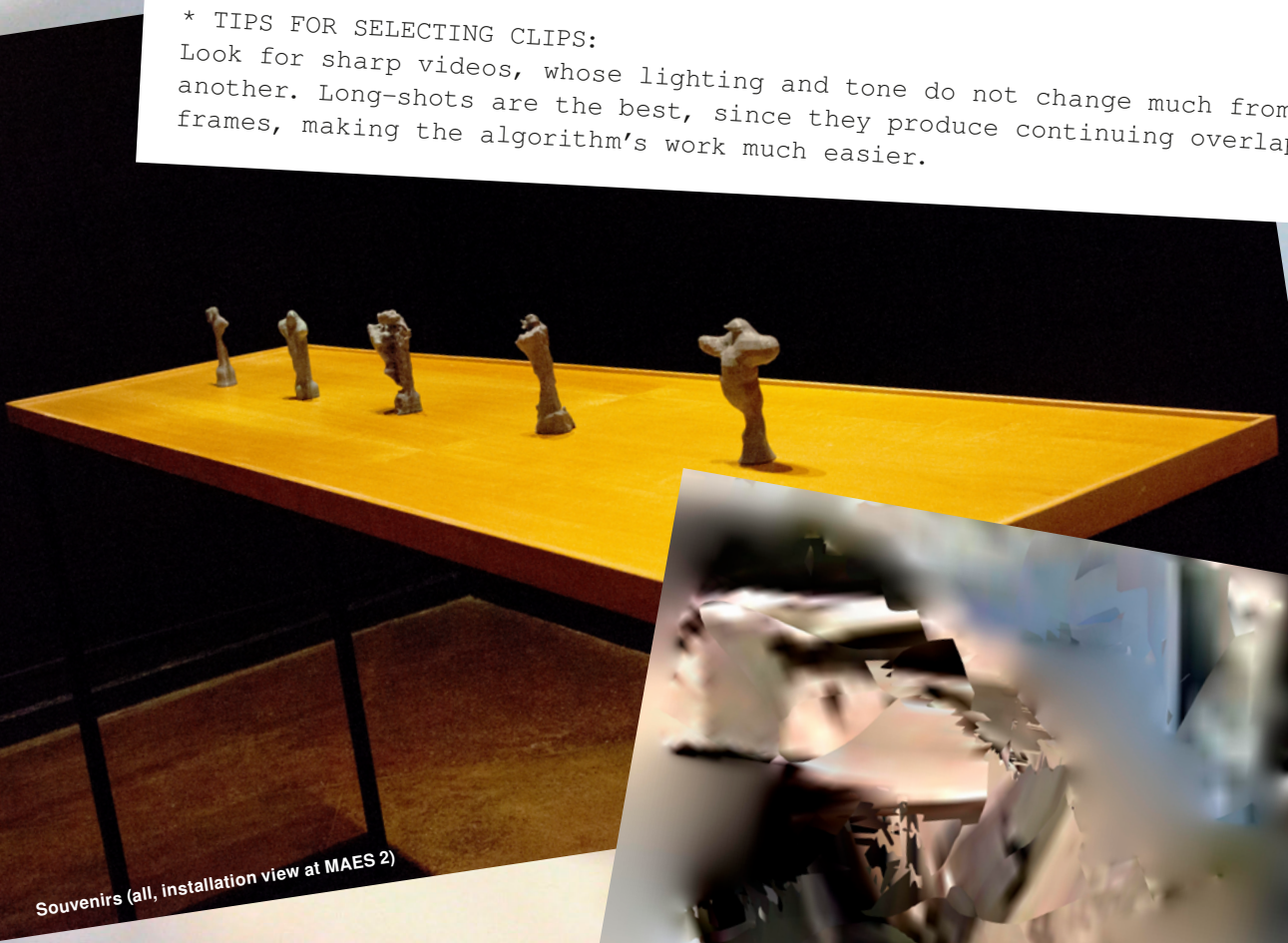
1. Go online and find some video clips that show as many sides of the monument as possible. We are aiming for a full 360° view of it.

2. Pick one of the clips* and, using a software such as MPEG Streamclip, extract a good sequence of frames from it. Something around 2-4 frames per second should be enough.

3. Process all of the frames using a structure from motion algorithm. This step can be accomplished with any consumer-level photogrammetry application. A great open source tool is VisualSFM, but there are more user-friendly, proprietary alternatives out there. Each software should produce slightly different results. The final choice depends on your personal preferences and your budget.

4. Export the resulting mesh and prepare it for 3D printing by closing holes and deleting non-manifold elements. Don't forget to scale the print so that the monument will fit on your shelf with the other collectibles.

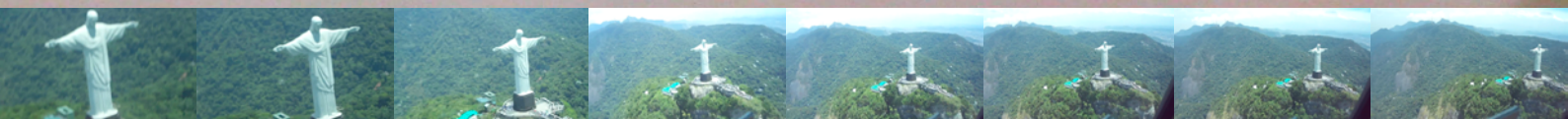
* TIPS FOR SELECTING CLIPS:
Look for sharp videos, whose lighting and tone do not change much from one moment to another. Long-shots are the best, since they produce continuing overlaps between the frames, making the algorithm's work much easier.



Souvenirs (all, installation view at MAES 2)

Souvenir 2 (3D texture)

3/3



Zach Rispoli Author	Snowden Crown Jewels Project	2015 Year

#device Format	#kipple Theme	#deface Action

A set of crown jewels dedicated to Edward Snowden

SNOWDEN CROWN JEWELS

1/2

The Snowden Crown Jewels are meant to be 3D printed in gold and silver at full size. It is possible that the online 3D printing marketplace *Shapeways* will print the full set for a few million dollars.

Technology has always had issues of class and power embedded within it. Whether it's a golden Apple product or a service literally advertised as the power to be brought anything you desire. We see this constantly. 3D printing is no exception. The 3D printed object is not yet a privilege granted to all. These models act as an example: freely available yet virtually unobtainable (except by a select few, of course).

An 8 inch bust of Edward Snowden, originally placed in Fort Green Park, Brooklyn as part of the art installation 'Prison Ship Martyrs Monument 2.0', was released for free on *Thingiverse* in May 2015. The Snowden Crown Jewels extends the intervention of this iconic male head into the digital marketplace and, hopefully, the homes of the extraordinarily affluent 3D printing elite.

RING

$ 29,999.00

Add to Cart

NECKLACE

$ 799,999.00

Add to Cart

CHALICE

$ 14,999,999.00

Add to Cart

SWORD

$ 349,999,999.00

Add to Cart

Cathrine Disney
Author

Synthetic Protection: Biointelligent Membranes
Project

2016
Year

#recipe
Format

#postnature
Theme

#morph
Action

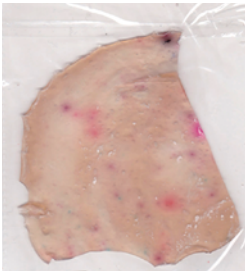
Biointelligent membrane offering synthetic protection from the disastrous effects of global warming

BIOINTELLIGENT MEMBRANES

Scenario:
In the year 2100, the unrestricted burning of fossil fuels has led to severe consequences for our planet. When fresh water from the melting polar ice caps flooded into the Northern Atlantic, it shut off the Gulf Stream, sending Europe into ice age in less than 3 years. The increase in more frequent and intense heat waves has caused several of the lakes in the USA supplying water to completely dry up, resulting in inhabitable desertification of the majority of Western USA. With these unpredictable extremes of weather, conventional clothing is no longer a suitable form of protection for the human body. A new form of synthetic protection has been developed to aid our survival in these new climates.

The Biointelligent Membrane contains genetically modified organisms that can respond to our environment. In an ice-age climate where temperatures rapidly decrease, the Biointelligent Membrane begins to produce a layer of insulating fibers that matt together to protect the wearer. As the temperature continues to fall well below freezing, the Biointelligent Membrane produces a second layer of fiber. These fibers are longer in length, hollow, allowing the air to be warmed by the sun and sent to the skin, and oily to prevent water from penetrating the skin. When conditions eventually stabilize and temperatures return to habitable degrees, the Biointelligent Membrane triggers a malting response in order to ensure the wearer does not overheat.

In extreme heat as temperatures rise, the Biointelligent Membrane forms an opaque surface on the skin, capable of blocking out the sun's harmful rays and radiating heat away from the body. In order to keep the wearer cool and avoid the dangers of sunstroke, the Biointelligent Membrane self-lubricates providing the wearer with continuous hydration. As temperatures continue to soar dangerously high, the scales of the Biointelligent Membrane open up, allowing the body to cool and breathe. As the environment begins to stabilize, the Biointelligent Membrane triggers a shedding response, returning to its original state, ready for the cycle to begin again.



BIOPLASTIC (RATIO 2:1:1:8)

- Starch
- Glycerine
- Vinegar
- Water

BIOINTELLIGENCE

- Genetically modified Escherichia coli

PROCESS

- Mix together the starch, glycerine, vinegar and water.
- Heat slowly and mix continually until a thick, clear paste is formed.
- Using a spatula, spread the paste over the desired surface area to approx. 3-5mm thick.
- Cool to 37 degrees Celsius.
- Inoculate with the genetically modified biointelligent Escherichia coli.
- Allow to dry for approx. 7 days.

Designed in collaboration with UCL Biochecmical Engineer, Dr Darren Nesbeth.

WRITING THE POST-TOUPÉE: 3D #ADDITIVISM AS PROVOCATION

"TO RESURRECT A LOST FULLNESS, THE TOUPÉE SUMMONS A PERPETUAL AND IDEALISED ALTERITY – A MORE PERFECT, BUT AT THE SAME TIME OBSOLETE, MASCULINE OTHERNESS AGAINST WHICH IT IS FOREVER FOUND WANTING."

3D #Additivism as a Provocation

Plastic testifies to the liveliness of death. It radically exceeds the organic corpses from which its petrochemical signature hails, squeezed by tectonics and technology into an entirely new form. This invites us to imagine how the human body might be subjected to synthetic processes so forcefully transgressive that the second law of thermodynamics would eventually become an inadequate, myopic basis for self-conception. This notion of a radically embodied biochemical mutation eclipses the specter of mortality as the ultimate endgame, introducing mind-bending, flesh-morphing elasticity into the uptight, inflexibility of death.

When we introduce additive manufacturing into this plastic metaphor, we are confronted with a mode of making that does not 'reveal' its object by hacking away at a larger whole, but builds up and out with endless room for speculative growth. Again, if we attempt to see ourselves in this, additive making explodes the figure of the fractured psychoanalytical subject who, having been violently hewn from a pre-linguistic state of blissed-out unity, experiences lack as the constitutive element of her psyche. When released from the narrative of desire that says we long to return to a more complete but unobtainable sense of self, we can allow our excitations to move unencumbered towards more speculative and unbounded becomings.

So the plastic and the processes deployed in 3D printing can be read as figures, respectively, for the decentering of finitude as an inextricable alterity to life, and the exploding of lack as the sole means through which we suffer that life.

As an artist prone to writing morbid pop songs that gravitate thematically towards wretchedness and self-dissolution, the 3D Additivist Manifesto stages a very particular provocation to my habitual muse. So, in an exercise of critical self-undoing,[1] I have very deliberately chosen to blast my practice with a photon beam of 3D #Additivism in the hope that the resulting impact might, to change from the micro to macro metaphor, knock my songwriting out of its habitual orbit with the 'Black Sun', and send it instead on a new trajectory towards undiscovered constellations of wigged-out pop speculation.

When I began working on this project, I proposed that I would birth a popular posthuman noise machine by exposing each element of my singing, dancing body to the dangly junk of 3D Additivism. Soon after, I found myself wondering more specifically: when trying to confound each aspect of my customary performance, what should I 'do', as an eager pop Additivist, with my balding pate? This question became something of a preoccupation, and, as a result, I've not yet got further than 'printing' myself a new hairdo.[2]

From Toupée to Post-Toupée

On certain heads, the bald spot begets a toupée. It is a very particular prosthetic device that figures the thinning pate as a site of lack – an emasculating dearth – that must be disavowed. In so doing, the toupée casts the full head of hair as a normative standard to which it then attempts to affect a return. The toupée effectively hides male neurosis behind an illusion of virile resplendence. But it 'can only play its role as veiled';[3] one gust of wind dashes the effect. Like Oz's titular Wizard (the ultimate figurative phallus), the toupée is 'the emanation of some remarkable effects' that alludes to a spectacle of 'mastery' but is latent and 'empty of content."[4] So we can understand the toupée as a phallic veil that strives to mask what is perceived, by some, as the enfeebling Real of baldness.[5]

But we can go further. By masquerading as a full head of hair, the toupée weaves a performance of plenitude in an effort to make good what has been lost to entropy and the passing of time. Psychoanalysis tells us that the melancholic subject remains libidinally attached to that from which they cannot bear to be parted; they summon in their psyches a 'lost object'[6] – a haunting, deathly trace of what they can no longer have. The toupée is precisely this psychical remnant made manifest atop the balding bonce – a melancholic invocation of a fecundity that once was. In attempting to resurrect a lost fullness, the toupée summons a perpetual and idealized alterity – a more perfect, but at the same time obsolete, masculine otherness – against which it is forever found wanting. It plays a role – assumes the look – but is effectively no more than a shadow of hairiness fallen upon the pate. It can never reinstate what has been lost. By reaching for this unattainable specter of lushness, the toupée 'fuels an affective political economy of loss and melancholia at the

1 Irit Rogoff, ***What is a Theorist?***
2 Julia Kristeva, ***Black Sun***
3 Jacques Lacan, ***The Meaning of the Phallus,*** in: Stephen Frosh, ***Sexual Difference: Masculinity and Psychoanalysis***
4 Stephen Frosh, Ibid
5 An aside: whilst Donald Trump appears to have gone for some complex and highly dextrous hair extensions rather than a toupée per se, his bouncing, coiffured mop helps sustain a spectacle of jingoistic bombast, veiling an abject array of personal and political paucities.
6 Sigmund Freud, Mourning and Melancholia, in: Peter Gay (ed), The Freud Reader

heart of the [balding] subject'[7] in which the wearer is defined by what they once had but are now forever separated from.

As I suggested at the beginning of this piece of work, 3D #Additivism invites us to recognize our (future) selves not in the 'metaphysics of finitude'[8] – the paradigm of inevitable decline – but in emergent exaptations, lichen-like sym-technologies, biological prototypes and, ultimately, in new forms of life. This prompts us to treat the bald spot as a vibrant site of potentiality instead of a void of melancholic lack. So just as we might articulate a new ontology of life by conceptualizing 'Life itself'[9] (as opposed to life's alterity), so too might we articulate a new ontology of the pate by conceptualizing the 'Pate itself' instead of the lost hair that others it.

In so doing, we can begin to understand the bald spot as a platform for revolutionary Additivist speculation. Instead of supporting an ossified monument to the lost liberal humanist hairdo (the toupée), the thinning pate now emerges as a print bed onto which radical plastic forms, designed in synthetic wetware programmes, might take seed and proliferate. By eschewing human mimesis for 'more-than-human, other-than-human, inhuman, and human-as-humus'[10] innovation, these confounding structures, sprouting up from the pate's downy ovoid plain like synthetic Cordyceps spores, herald the dawn of the post-toupée.

A Post Toupée Prototype

1. Fix the top end of an unopened bio live yogurt pot to your head using the stretchy rubber straps from a snorkeling face-mask.

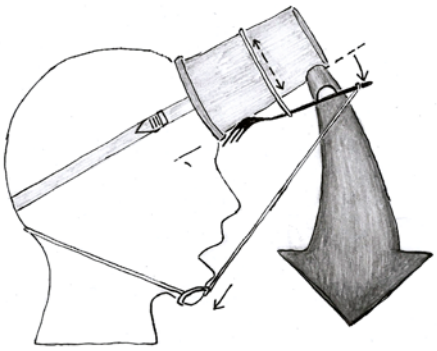
2. Cut a hole the size of a 10p piece near the base of the yogurt pot, being careful not to spill any contents.

3. Using a dinner fork and elastic bands, attach a pivoting lever along the length of the yogurt pot, with the prongs pointing towards your forehead. In its resting position, the fork handle should cover the hole that you made previously. Fix a sponge to the top of the fork handle so that it forms a tight seal over the hole.

4. Tie a piece of wool to the fork handle. When you pull on this, the fork should pivot open, allowing yogurt to exit the pot. Again, be careful not to spill the contents at this stage. Leave this piece of string dangling for now.

5. Push a plastic shower curtain ring onto your chin. Tie it firmly in place using a length of wool passed behind your neck. This is now your chinstrap.

6. Keeping your mouth closed, tie the piece of wool that is dangling down from the fork handle to your chinstrap. Fix it tightly enough to remove any slack.



7. When you open your mouth, the chinstrap should now pull down on the fork handle. If you keep your mouth open wide, dollops of yogurt should plop out continuously. When you close your mouth again, the yogurt flow should cease.

8. (OPTIONAL ADDITION) Before step one, remove the lid and the plastic film from the pot, and immerse a piece of cat faeces in the yogurt. Put the lid on again and seal tightly with gaffa tape. Proceed to step one. **Warning: do not use if you are pregnant or trying to conceive.**

Applications/Futures for The Post Toupée Prototype

1. Place some bowls on the floor in front of an assembled audience. Drip the yogurt from your post-toupée into these bowls, and then pass them around. It is unlikely that anyone will accept, but that's fine. The key point here is to demonstrate the post-toupée's potential capacity to jack directly into the audience's neurochemistry. The live bacteria in the yogurt modulates the intestine's microbiotic profile, which, in turn, writes itself into 50% of the dopamine and a vast majority of the serotonin that the body produces.[11] In this way the post-toupée completely bypasses the hollow, remote sexual signification of the quiff or the pompadour; its bio-mechanical discharge delivers

07 Rosi Braidotti, *The Politics of "Life Itself" and New Ways of Dying,* in: Diana Coole and Samantha Frost (eds), *New Materialisms: Ontology, Agency and Politics*
08 Ibid
09 Ibid
10 Donna Haraway, *Anthropocene, Capitalocene, Plantationocene, Chthulucene: Making Kin*
11 Peter Andrey Smith, *Can the Bacteria in Your Gut Explain Your Mood?*
12 Kathleen McAuliffe, *How Your Cat Is Making You Crazy*

a dose of sensual psychiatry – a haptic neurone caress – to anyone who cares to interface with it.

The addition of cat faeces to the yogurt administers an altogether more terrifying dose of toxoplasmosis.[12] We recommend that this is used for figurative purposes only (i.e. don't actually offer it to your to audience) in order to articulate the more cruel dimensions of 3D #Additivism. By suppositionally introducing this behavior-modulating parasite into the already complex community of gut flora, the post-toupée mutates the foreign DNA[13] – the actant chthonic intensities – already imprinted within us. This eviscerating image of transhuman symbiotic conglomeration shatters our auto-identifying illusions of mastery, control and self-determinism. The very idea of the post-toupée (with added cat faeces) thus stages a dirty protest at the doorstep of humanist individuation, its diabolical tendrils bearing a whiff of what is already within. There never was a sanctity of self; 'to be a one at all, you must be a many.'[14]

2. Use your post-toupée to confound the phallic power dynamics embedded within Symbolic language. Whilst constative utterances attempt to fix words within a chain of authoritative signification, your post-toupée aligns your speech act with a weird and globular emission that refuses equivalence and interpretation. Instead of agonizing over words – of editing, deleting and self-censoring – let your utterances stack up into an accumulative and excessive jumble of noise. Think of your mouth (in concert with your post-toupée) as an OR gate that enables multiple, polyvalent speech signals to flow unencumbered into a poetic, performative pool of phonetic thingness. Let this bio-noise – this embodied splatter – endure in environments that expect you to make sense. This will make for some odd, difficult but productive moments.[15]

3. Align your post-toupée with the Peacock Spider sex dance. This is achieved by painting bright abdominal markings onto a plastic bag, gaffa taping the bag to the nozzle of a hair dryer, cable tying the hair dryer to a poncho, putting the poncho on and plugging the hair dryer into a 4-way power socket suspended between your legs. Once the bag is fully inflated, stick your arms out at jaunty angles and shuffle from side to side. Write a brilliantly weird pop song that you can sing and dance along to.

Peacock Spider sex dance

4. Try to finish the song before you launch your post-toupée. You might fall short of your ambition here, but that's understandable. You've probably put a lot of pressure on yourself, expecting the song to 'do' too much. This approach is often prohibitive. Remember that the post-toupée is an enabling, ongoing proposition, so be OK with what you've got so far.

5. When writing about your post-toupée, try not to simply describe it using shored up academic conventions.[16] See if you can get your words to 'act out' some aspect of its functionality. This is really hard to do, and might not manifest completely in any one piece of work.

6. When documenting your post-toupée on video, make sure you record the sound with a binaural microphone. Rub the post-toupée up against the microphone as you discharge your emission of strangely mellifluous yogurt sounds. Think about how this video might be more than a supportive document. Let this recording of your post-toupée function as a quantum particle that is able to trigger intimate, tingly sensations from a distance. Think about how the digital medium might facilitate the post-toupée as a 'spooky action'[17] that reaches through the screen and touches the viewer directly. Upload your video to an Autonomous Sensory Meridian Response (ASMR) channel on YouTube.

7. The post-toupée is suitable for all pates everywhere. It works on any balding head, muscular hydrostat, exoskeletal cartilage, gelatinous scyphozoa or Dendrogramma Enigmatica; just adjust the straps accordingly.

13 Jane Bennett, *Vibrant Matter: A Political Ecology of Things*
14 Donna Haraway, *Anthropocene, Capitalocene, Chthulucene: Staying with the Trouble*
15 Simon O'Sullivan, *Art Practice as Fictioning (or, myth-science)*
16 Gavin Butt, *After Criticism: New Responses to Art and Performance*
17 John Markoff, *Sorry, Einstein. Quantum Study Suggests 'Spooky Action' Is Real*

Henrik Nieratschker
Author

Minusplusplus
Project

2016
Year

#fabulation
Format

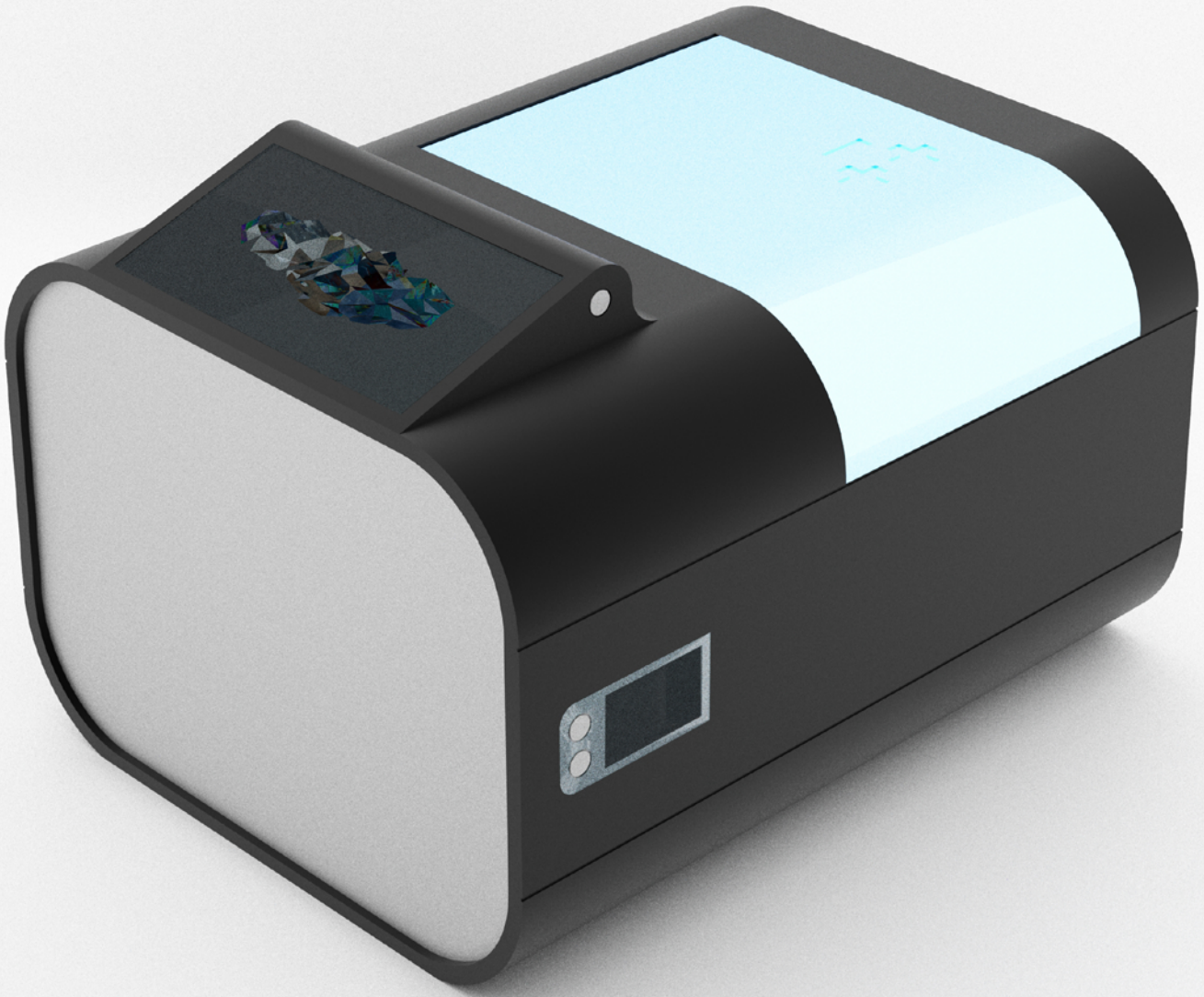
#figures
Theme

#deface
Action

A fictional Silicon Valley start-up company, developing products that train your brain for utopian futures

1/4

MINUSPLUSPLUS



MINUSPLUSPLUS
Finding the Future. With Technology

Today the world is complex.

You became more accelerated, more intelligent, more efficient, more connected, more public, and more aware.

We are thinking in networks. We understand how thoughts work.

We are printing information in three dimensions. And we make the internet our brain.

Minusplusplus is here with you, to ask the questions that need to be asked. The big, important questions, the difficult questions, the controversial and the overlooked questions.

All the questions that need to be asked to make this complicated world a better place.

Minusplusplus
Finding the Future.
With Technology.

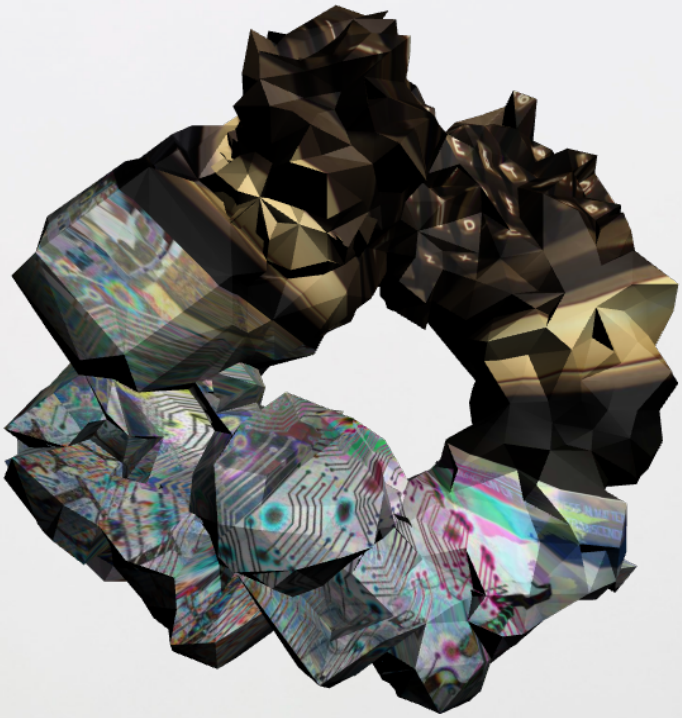
MINUSPLUSPLUS
Understanding Complexity.

At Minusplusplus we brought philosophers, neuroscientists and technologists together to build the products that make us understand our complex world in a better way. Combining 3D printing technology and network algorithms with a deep understanding of neuroscience and philosophy, we created the first product to train your brain for Utopian futures. Our intelligent 3**Discourse**-Algorithm uses principles observed in the human brain to scan the Internet for search terms and then generate and print a three-dimensional manifestation of your chosen topic.

The abstract shape and feel of the devices is designed to build new connections between the many different parts of your brain and your chosen discourse. So that just by observing and handling your printed devices you create a super-heightened awareness for your discourses and ultimately more and more potential for valuable and groundbreaking new insights.

With 3**Discourse** we bring you, and your brain, one step closer to a better world.

Minusplusplus
Understanding Complexity.



Appendix

Minusplusplus is a fictional Silicon Valley start-up company, imagined as a multi-platform art project that currently consists of a physical showroom installation, as well as a web presence that spans a company website, crowd-funding campaign and social media. The fiction aims to challenge views on innovation, technology and better futures in the context of Silicon Valley tech culture and to widen the discussion by associating political, social and philosophical discourses.

In a first instance the company presents their flagship product 3Discourse. The fictional product line combines the 'revolutionary' potentials of 3D printing with cutting edge research in neuroscience and notions about the production of knowledge from social sciences and philosophy. An algorithm, inspired by neural processes in the human brain, scans the Internet for a keyword and uses related search terms and images to create a three-dimensional manifestation of a discourse, that can then be materialized by a 3D printer. The 3D models are generated as abstract hand-held Neuro-Training Devices, allowing users to stimulate many areas of their brain and gain awareness and insights on their chosen discourses.
The installation takes the shape of a fully branded company showroom presenting the small, multi-colored and multi-faceted 3D prints on clean, white retail furniture designed to fit the company's visual identity. Elevated on clear, acrylic glass, they are each accompanied by a name tag, showing captions like 'Arab Spring', 'Climate Change', 'Ferguson' or 'Algorithmic Trading'. The installed showroom is completed by a screen showing advertisement videos, a roll-up banner, business cards and an info terminal displaying the company's website www.minusplusplus.com and a crowd-funding campaign. The Kickstarter aims to make part of the fiction a reality by raising funds to launch a 3Discourse on Demand service that allows customers to order custom 3D prints for a search term of their choice through the company website.

The project looks at 3D printing as a symptomatic technology within contemporary (tech) culture. Its revolutionary potential is long promised but yet to be reached. This work takes it one step further by directly applying it to the discourses technological progress often fails to address adequately (even though it does this on a semi-fictional, speculative and theoretical level, allowing the technology to comment on itself).

The Speculative Prototyping Lab, University of California, Irvine (Jesse Jackson)
Author

Speculative Prototyping: Making Plastic Printing Sustainable and Playful
Project

2015-2016
Year

#methods
Format

#play
Theme

#extrude
Action

Playful and sustainable potentials of 3D printing pedagogy

SPECULATIVE PROTOTYPING: MAKING PLASTIC PRINTING SUSTAINABLE AND PLAYFUL

The Speculative Prototyping Lab

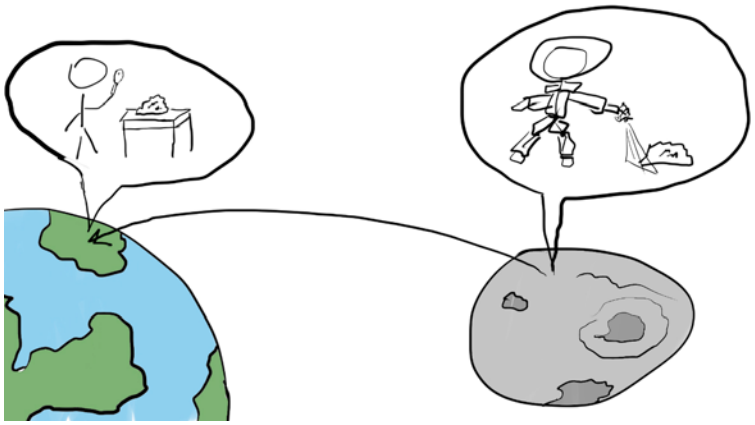
The Speculative Prototyping Lab at the University of California, Irvine (UCI) pursues projects at the intersection of media art and speculative design in collaboration with artists, designers, engineers, scientists, humanists and the general public. Two recent Speculative Prototyping Lab projects by multidisciplinary design teams of undergraduate students and faculty mentors from six different study programs hosted by three academic units, are additivist in nature. One is focused on *Making Plastic Printing Sustainable*. The other group is focused on *Playful Fabrication: Envisioning the Future of 3D Printing*. Both groups are focused on how we should make in the future instead of what we can make in the present: the first on the nuts and bolts of what might make the additivist process sustainable or at least less wasteful; the second on what playful potentials remain untapped and point to future opportunities.

Making Plastic Printing Sustainable

While 3D printing based on the fused deposition of polymer filament is not new, they are now readily available at various price-points in the consumer market. This proliferation was initiated in the do-it-yourself community by the open-source RepRap project in 2005, and further popularized by a variety of commercial enterprises. A possible negative byproduct of more ubiquitous 3D printing would be an era of physical spam, marked by the production of what the Institute for the Future has called ‘a large number of objects of infinitesimally small value’. Spam or not, these objects are creatively empowering, providing consumers with opportunities for personal expression previously only available to experts.

Though its publication predates the rise of these technologies, Braungart and McDonough’s *Cradle to Cradle: Remaking the Way We Make Things* provides a useful framework for considering how the deleterious effects of physical spam might be offset. Their concept of technical nutrients – materials that remain within closed-loop cycles – is particularly pertinent, given that the two most common materials used in consumer-oriented 3D printing, acrylonitrile butadiene styrene (ABS) and polylactic acid (PLA), are each proven candidates for cradle-to-cradle processes.

Making Plastic Printing Sustainable is a Speculative Prototyping Lab



project focused on showing how today's technologies – waste plastic recovery, custom filament extrusion, and human kinetic energy – can be integrated into the nutrient workflow of tomorrow, in which the objects they make are continually upcycled, physically and creatively, into new and improved objects. The team has assembled, tested, and refined a mobile demonstration of what #additivism might look like in a future condition that is sensitive to pollution, challenged for resources, or both.

Playful Fabrication: Envisioning the Future of 3D Printing

We now have the opportunity to put 3D printers on our desktops. The vast majority of the use cases put forward for doing so are functionalist and utilitarian. This parallels the early days of the personal computer, where the emphasis was on technical uses for calculations and algorithms, and only when computers could be used to make music, create documents, and play games did a compelling narrative for a computer in the home emerge. Core to this transformation was a shift away from command-line interfaces and applications designed for engineers and programmers, towards programs that made the technology accessible to everyday users.

Playful Fabrication: Envisioning the Future of 3D Printing is a Transformative Play Lab project that seeks to challenge practical approaches to 3D printing by conceptualizing and prototyping experiences that illustrate the untapped expressive power these technologies might permit. Co-hosted by the Speculative Prototyping Lab, the team has envisioned over thirty 'playful futures' for 3D printing ranging from the silly (a printer fueled by human waste) to the far reaching (a printer that takes signals from probes on alien worlds and recreates extraterrestrial objects on Earth).

More recently, the team is developing Terraform, a civilization-building online strategy game that explores an explicitly playful use case of personal fabrication technology. The current prototype of Terraform uses the Unity 3D game engine to communicate gCode commands to a Printrbot Play. The 3D printed building units that result function as fiducial markers for an augmented reality system, allowing the player to track the colony's status by viewing the units through a tablet. This proof-of-concept for a more playful future suggests several directions for #additivism that are currently underexplored, including direct communication between different virtual platforms, and printed objects used as characters in a language.

Critical and Pedagogical Intentions

The critical intentions of Sustainable Prototyping Lab projects are not instrumental. They do not propose to solve a problem, and though these outcomes are not necessarily unwelcome, they are not oriented towards commercialization or entrepreneurship. For example, while Making Plastic Printing Sustainable successfully demonstrates how #additivism might become less wasteful, the design of the vehicle for demonstration – a mobile, participatory, bicycle-powered assembly, installed as public art – prioritizes maximum provocation over efficient function. Playful Fabrication operates in an explicitly conjectural mode, brainstorming as far away from current practice as possible, and circling back towards an unforeseen opportunity. Pedagogically, these ways of working permit students to explore multiple hypothetical futures, rather than orienting themselves towards a narrow vision constrained by commerce, capital, the current capabilities of technology, and other false limitations. Their speculative prototypes to date suggest that the future of #additivism is mobile, sustainable, playful, and fun.

Extra Credits: Jesse Colin Jackson, Speculative Prototyping Lab, Claire Trevor School of the Arts in collaboration with Josh Tanenbaum, Karen Tanenbaum, & Michael Cowling, Transformative Play Lab, Donald Bren School of Information and Computer Sciences and Mark Walter, Henry Samueli School of Engineering and the following undergraduate students William Amos (Environmental Engineering), Amihan Amargo (Mechanical Engineering), Tina Chau (Art), Tom Chen (Computer Science, Electrical Engineering), Patrick Chung (Mechanical Engineering), Aaron Hilado (Art), Jard Hsu (Computer Science), Aldrin Lupisan (Environmental Engineering), Amanda Ortscheid (Computer Science, Anthropology), Ethan Pen (Mechanical Engineering), Eunji Russ (Art) funded in part by The California Institute for Telecommunications and Information Technology all at the University of California, Irvine.

NOTES ON THE SPECIES DIVERSITY OF ARTIFICIAL OBJECTS

"REGARDLESS OF CAUSE, A CONSENSUS AMONG RESEARCHERS CONFIRMS THAT THE DECLINE IN POPULATION OF THESE CREATURES DIRECTLY COINCIDED WITH THE END OF THE SECOND DARK AGE."

Some time in the middle of the Second Dark Age a species of roaming artificial creatures populated major metropolitan cities in an unprecedented abundance. The creatures appeared to cohabitate with humans and other animals during a prolonged time of equanimity. However, as populations ballooned and urban ecosystems became overwhelmed with the pervasiveness of these specimens, a sudden catastrophic event curbed their spread. Pinpointing the exact moment in which this event occurred is hard to determine, since investigations into biological evidence of extinction has yielded no convincing hypothesis. Instead, it appears as though the climactic moment for the species might've been the result of a deliberate act on the part of humanity. Some speculate that legislature was passed in order to modify breeding, others speculate that new technologies made procreation for the species impossible. Regardless of cause, a consensus among researchers confirms that the decline in population of these creatures directly coincided with the end of the Second Dark Age.

Though these creatures have gone into extinction, their terrestrial impact can still be observed. Due to their distinct artificial make-up, researchers have begun the work of mapping their extensive ecosystems. Upon first examination, the species diversity is so vast that analysts have had to subdivide population groups into hyper-local strains in order to differentiate unique subspecies characteristics. Where most analysis of these kinds look at the marco-ecological impact, our team has instead opted to focus on microcosms of activity in hopes of discovering patterns of biodiversity. The purpose of this study is not to pinpoint the cause of extinction, but instead to identify the particularities of species characteristics and their relation to a specific geographical location.

Before delving into the particular characteristics of the geographic sample chosen, some initial discoveries regarding common traits should be communicated. As initially stated, the primary material composition of these creatures is of *artificial* origin. As the species matured, the outer membrane began to contain traces of organic augmentation, due to a generational process of self-replication. However, these trace amounts of organic material did not change or alter the rate of decomposition. Due to the slow rate of decomposition observed in the artificial material of the membrane, current researchers have speculated whether the introduction of organic material was an evolutionary mutation.

As we can see here, the artificial membrane is the primary physical attribute of the creature. Initial research suspected that this membrane was a layer of skin or other protective surface that would be shed over time – a hypothesis that substantiated the theory of organic evolution but also incorrectly influenced population projections at the height of species development. As sociological data began to be incorporated, researchers found that the membrane was not a discarded husk shed from a larger physical core but instead was the entirety of the creature's physical appearance. Much like the physiological design of Class *Scyphozoa*, these creatures display no discernible biological interior for metabolic ingestion. Although the physical resemblance between these creatures and other common jellies is hard to deny, a primary differing characteristic is the lack of any tentacles or nematocysts. This, combined with no discernible nervous system, makes classification particularly troublesome for our research team.

Another common trait amongst all variations and subspecies can be found at the 'mouth'. Where the membrane becomes most open, two symmetrical extensions stretch out to form hoops. Hoops vary in size and membrane thickness and in some recorded samples researchers observed damage to these physical features resulting in stunted breeding.

Due to the lack of any discernible muscular tissue, researchers speculate that these hoops were integral to species mobility. Some analysts speculate that evidence of strain and damage to these areas of the membrane are due to a symbiotic or parasitic relationship wherein the creatures latched onto a mandible of another life form in order to expedite travel and population distribution. Otherwise, the creatures must have traveled much like spores from fungi, relying on wind currents as is depicted in our research simulations. The malleability of the membrane to contract and expand suggests the creature could easily travel great distances from the slightest breeze. This hypothesis is further supported by observing clusters of population density occurring at locations where potential entanglement – as a result of arbitrary air currents – could occur. In the sample area discussed below, sociological data indicates that density spikes frequently occurred where permeable surfaces like chain-link fences once existed.

The two noticeable physical consistencies – hollow artificial membrane (with traces of organic material), and symmetrical hoops – are the only major characteristics found within all population deviations. Physical attributes including size, membrane durability, color, patterning, and average age all appear to be dependent on birthplace or – as our researchers prefer to say – point of origin.

The *Commune Nigris* breed, for instance, could live in the wild for many years and would often travel great distances away from their point of origin. The *Commune Nigris* primarily originated from sites of everyday exchange such as corner stores and what was colloquially called *bodegas*. These sites appear to have been ideal ecosystems for breeding. Dimly lit with wall-sized areas kept at a cool temperature, these points of origin were hubs of activity for a variety of subspecies. The *Commune Nigris* thrived in biogeographical areas that contained several of these breeding sites within a short walking distance. The high frequency of these sites does not seem to appear as a redundant measure when cross-analyzed with sociological data.

Though the lifespan of the *Commune Nigris* varied to a great degree, one could easily distinguish this breed from others due to a jet black and remarkably thin outer membrane. Sociological data suggests that the thinness and flimsy durability of the *Commune Nigris* membrane would almost appear translucent at dusk – a phenomenon that other breeds also share. Unlike other common organic creatures, the *Commune Nigris* is remarkably never officially classified as a pest.

Due to the overall simplicity of physical markings, membrane consistency, durability, and hoop regularity, many researchers believe the *Commune Nigris* to be one of two primary strains from which all breeds mutate. The other primary strain has been named the *Commune Albis* for having all the same physical characteristics as its sister breed with the exception of being white in color. Though less dominant in population frequency than its darker sibling, the Albis is still considered significant due to the amount of breed variations that have white as their base color. Common mutations of the *Ablis* occur in outer membrane markings and overall membrane thickness. Mutation range for the Albis is so diverse that subspecies and generational breeds have mostly gone unclassified.

One recurring membrane marking closely resembles a type of lettering not all that dissimilar from English print. Though variations of those markings have spelled out several indeterminable phrases, the *patterns* of these markings tends to repeat in horizontal strips. Striped patterns of these markings have began to be classified as *Gratias Iterum Ablis* based on preliminary sociological data gathered from our sample area. Non-patterned markings also exist within *Ablis* mutations, but researchers have found that any potential 'phrases' are similarly indecipherable as the *Gratias Iterum*. It is suspected that because these creatures contained artificial materials, some markings could be the result of a type of branding that was commonly used on livestock. This hypothesis has recently grown in popularity – so much so that some researchers argue that all markings found on creatures are some form of branding. If this were the case, all creatures with a white membrane base color *regardless of markings* would be classified as *Commune Albis.*

Albeit these two primary breeds account for a significant portion of the species population, other strands have also been observed. For instance, the *Sacculum Rubei* – a distinct breed that displays a bright red hue covering the entirety of its outer membrane – was only able to be classified as a unique subspecies after sociological data was referenced. In this instance, the point of origin for the *Sacculum Rubei* was unlike other *Commune* breeding sites in a variety of ways. Due to the geothermal warmth of the site, and the documented sociological account of soul food being distributed from this location, researchers speculate that the species overall must be affected by temperature. Though some argue that this correlation is only substantiated by researchers limited understanding of color theory.

Sociological data suggests that that sites with unique subspecies breeding were places of business that would've regionally been identified as 'locally owned'. This rare form of business was viewed as a type of resistance against larger corporately managed franchises. Though the antagonism between 'locally owned' sites and franchise locations is never explicitly illuminated through subspecies breeding, sites that were not managed by larger corporate entities would rarely use the type of branding more commonly found on Commune Albis mutations. Instead creature breeding at 'locally owned' points of origin often resulted in subspecies characteristics atypical from the vast majority of other subspecies – as is the case with the *Sacculum Rubei.*

This is to say rarer subspecies strains were not always the result of 'locally owned' breeding. The *Smaragdus Sacci* was a bright green breed with a remarkably thin membrane. Often appearing in intertwined pairs – with one creature nested into the other – the *Smaragdus Sacci* membranes were often covered in branded markings as well as containing several holes. Though translation of markings is still underway, researchers have argued that the branding on this subspecies indicates that the point of origin was most likely a franchised place of business primarily distributing grocery goods. Perhaps most significant is that sociological data suggests that the *Smaragdus Sacci* might be one of the first and largest breeds to have gone extinct.

An extremely rare breed identified at the *Eximius Pullum Onerariis* (or EPO) is a significant leap for our research team because it points to an important moment within the genealogy of the species. Initial analysis of the sociological data for the *Eximius Pullum Onerariis* suggests that the creature not only displayed superior physical attributes, but also hosted within its membrane other subspecies. These nested breeds of differing origin suggest accelerated creature distribution would often result in 'packaging' the *Eximius Pullum Onerariis* with other inferior breeds (including the Commune Albis).

This startling discovery challenged all previously held notions about species populations and breed migration. If creatures of dissimilar breeds were being grouped together, with larger and superior breeds playing host to their less evolved siblings, then it could be argued that these creatures were entirely devoid of neurological agency – in which case human cooperation and intervention in species distribution could be seen as the primary force behind the ecological havoc which marked much of the Second Dark Age.

The troubling reality of this hypothesis becomes all the more illuminating when considering the rapid decline in species population that occurred subsequently after accelerated distribution practices became common place. It has been argued that during this time humanity began to see the error of their way, or at least began to contemplate the severe ramifications of species dominance in urban ecological environments. Although little information about species extinction and the catastrophic event that halted subspecies breeding is known, correlations between the appearance of cross-species hosting near the final stages of species genealogy is hard to ignore. As our team has focused on the later stages of the geological time-line of this species, new life forms of similar physical design began to emerge. It is unclear if these new lifeforms prayed on the creatures of our study, or what exactly catalyzed their existence, but the ecological impact of their introduction within this time proved overwhelmingly beneficial.

Alison Bennett, Megan Beckwith and Mark Payne, featuring Jacki Hammer
Author

Virtual Drag
Project

2016
Year

#blueprint
Format

#beyond
Theme

#bridge
Action

An immersive exhibition of 3D scans of drag queens and kings for virtual reality headset and projection

VIRTUAL DRAG

1/3

Virtual Drag features 3D scans of drag queens and drag kings made with photogrammetry. We were interested in exploring this photographic technique for creating assets for virtual reality. The virtual reality experience extends for about ten minutes and is made of four scenes built around the personalities of six drag personas. The personas are: The magnificent Philmah Bocks, the divine Art Simone, the knee weakening Transylvanian Gypsy Kings, and Jackie Hammer, who is simply a bit of a hot mess really...

The 3D models were created using digital photogrammetry, a form of expanded photography that builds 3D models from a series of 2D photographs. The photogrammetry process uses the shifts in perspective between each photograph to construct a 3D mesh model of the subject. The surface is constructed from a patchwork of the photographs wrapped around it. The somewhat glitchy quality of the process was not erased in order to reveal the qualities of the process. Indeed, we feel that there has developed a normative look and style within 3D works that we wanted to rupture. The glitchy qualities of our models that lie in both the photographic and the broken was part of this investigation.

The models were animated with minimalist choreography by inserting armature that also defied conventions. Meshes deformed in odd ways, stretching clothing and bodies. Finally, the animated models were placed in a 3D computer game environment that allowed the viewer to look round the virtual environment in real time while being guided by a camera path that at times had viewers clutching at the table in front of them!

The virtual reality work is presented with the VR headsets resting on white dressing tables. The installation included prints of the model 'textures' that reveal something of the process behind the work. Visitors were greeted by one of the artists dressed in a pink apron and invited to sit before the mirror as we fitted the VR headset. Many elected to wear the pink boa while viewing the work.

Through the process of making and exhibiting this work, we are exploring the potentials of the relationship between 'drag' and 'virtual'. Not only is this an opportunity to ask how virtuality might reflect upon gender but, perhaps even more interestingly, how might the notion of 'realness' and the practice of drag performance offer fresh perspectives on the cultural production of virtual reality.

Perhaps reality is the problem ('reality is always the problem, darling'). The use of the term 'reality' in virtual reality is aspirational. It's not really reality. Although the brain responds to stereoscopic images as 'real', we still know it is a mediated experience. Perhaps we could call it virtual media. But all media are virtual. The distinctive feature of this media is its immersive qualities – even more so than cinema. The headset removes peripheral intrusion and the loss of the fixed frame gives the viewer a degree of agency. Immersive Media may be a more accurate label. If drag performance reveals gender identity as performative and emergent, perhaps we can rethink VR experiences as a form of becoming in mediation, of performing emergent potential. Either way, it is a form of drag.

3/3

The project was funded by the Australian Government through the Australia Council for the Arts, its arts funding and advisory body.
We also had assistance from Deakin Motion Lab and Media Lab Melbourne.

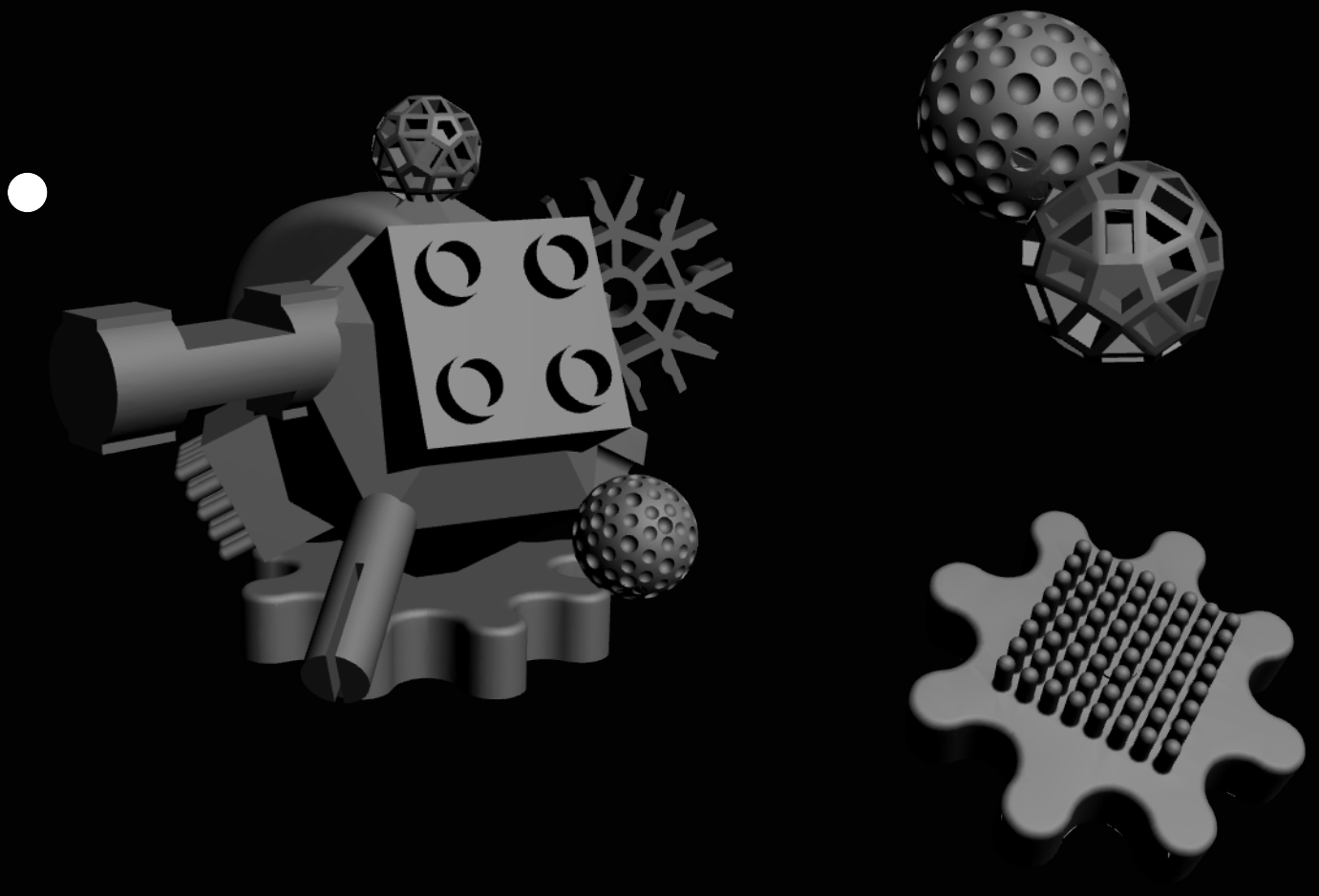
Golan Levin and Shawn Sims Author	Free Universal Construction Kit Project	2012 Year

#toolkit Format	#play Theme	#bridge Action

A matrix of adapter bricks that enable complete interoperability between ten popular children's construction toys

FREE UNIVERSAL CONSTRUCTION KIT

1/3



The ‘Free Universal Construction Kit’ is an Additivist *gedankending*: a matrix of adapter bricks that enable complete interoperability between ten popular children’s construction toys. By allowing any piece to join to any other, the Kit encourages totally new forms of intercourse between otherwise closed systems. As with other grassroots interoperability remedies, the Kit implements proprietary protocols in order to provide a public service unmet, or unmeetable, by corporate interests.

The Free Universal Construction Kit is not a product, but a provocation. It offers working adapters between Lego, Duplo, Fischertechnik, Gears! Gears! Gears!, K’Nex, Krinkles (Bristle Blocks), Lincoln Logs, Tinkertoys, Zome, and Zoob – adapters which can be downloaded for free from various sharing sites as a set of 3D models suitable for reproduction by personal 3D printers. In so doing, the Free Universal Construction Kit prompts consideration about intellectual property, open-source culture, and reverse engineering as a mode of cultural practice.

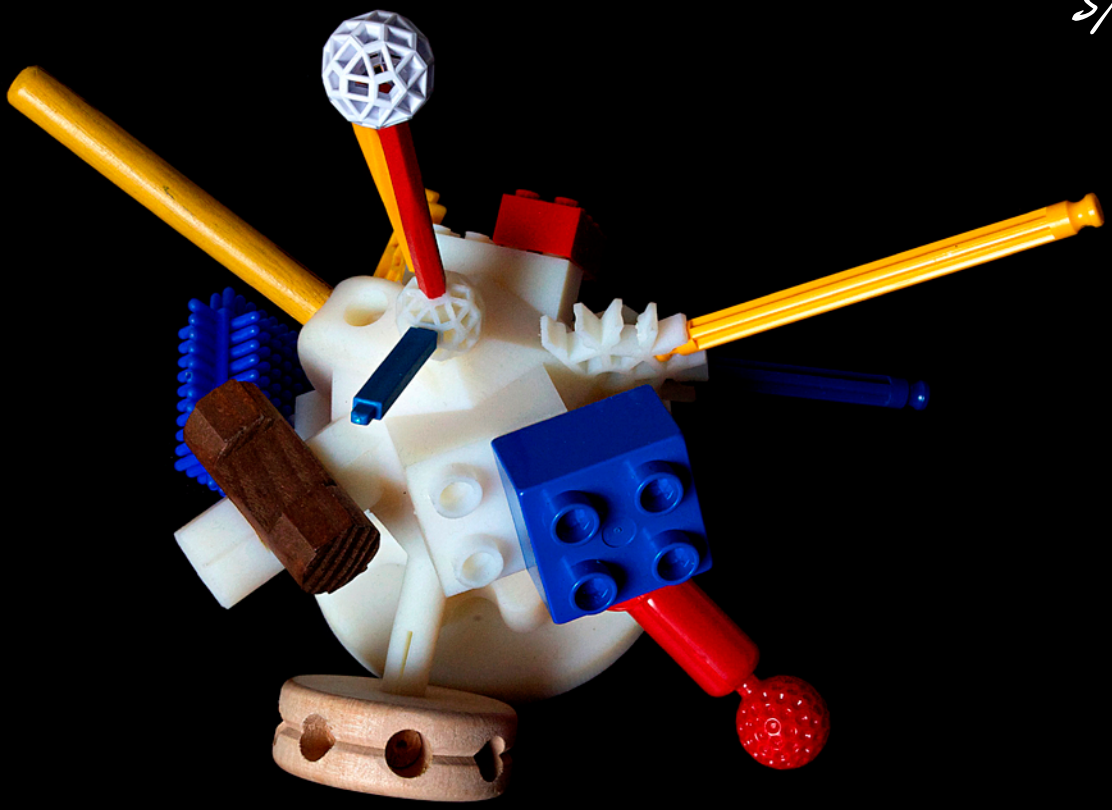
Opening doors to new creative worlds is one major reason we created the Free Universal Construction Kit. Another is that we believe expertise shouldn’t be disposable – and that childrens’ hard-won creative fluency with their toys shouldn’t become obsolete each Christmas. By allowing different toy systems to work together, the Free Universal Construction Kit makes possible new forms of ‘forward compatibility’, extending the value of these systems across the life of a child.

In producing the Free Universal Construction Kit, we aim to demonstrate an Additivist model of ‘reverse engineering as a civic activity’: a creative process in which anyone can develop the necessary pieces to bridge the limitations presented by mass-produced commercial artifacts. We hope that the Kit will not only prompt people to create new designs, but more importantly, to reflect on our relationship with material mass-culture – and the rapidly-evolving ways in which we can better adapt it to our imaginations.

The Free Universal Construction Kit comprises nearly 80 two-way adapters, which allow each of the different construction toys to interface with any of the other supported systems. Prior to modeling, the dimensions of the various toy connectors were reverse-engineered with an optical comparator accurate to less than two microns. The resulting precision ensures that the Free Universal Construction Kit ‘actually works’, enabling tight snap-fits between custom and commercial components.

Free Universal Construction Kit
Project

#toolkit	#play	#bridge
Format	Theme	Action



Everardo Reyes-Garcia
Author

Design by Disruption
Project

2012, 2014
Year

#methods
Format

#alchemy
Theme

#collapse
Action

Design methods based on disruption and meta-transformations from one media to another

DESIGN BY DISRUPTION

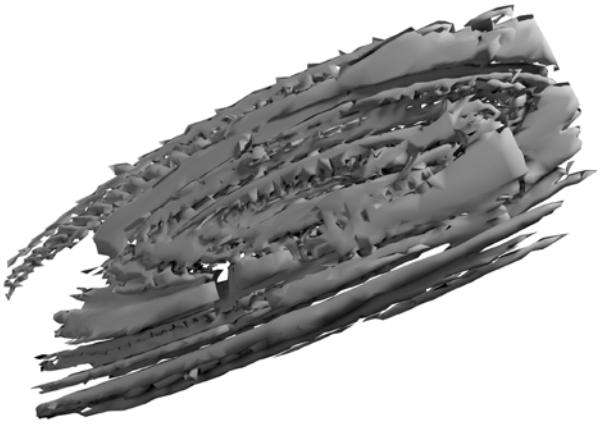
1/2

Fig. 1

The relationship between art, design, and technology can be observed from the standpoint of disruption and aesthetic provocations. The importance of fostering such practices is to challenge traditional movements toward standardization and perfection. I am rather interested in using technology for non-positivistic goals; to follow the idea that computers and code hold a human imprint, which is charged with questions that art and philosophy can speculate to answer.

'Disrupting 3D models' was originally presented at the Computer Art Congress 3 (Paris, 2012). It is a small application made with Processing with the intention to open an external 3D model (STL format) and to render its geometry in three different modes: quads, triangles, and points. The application proposes three parameters to disrupt the geometric composition following semi-stochastic procedures. The results are chaotic 3D meshes of the original model (fig. 1).

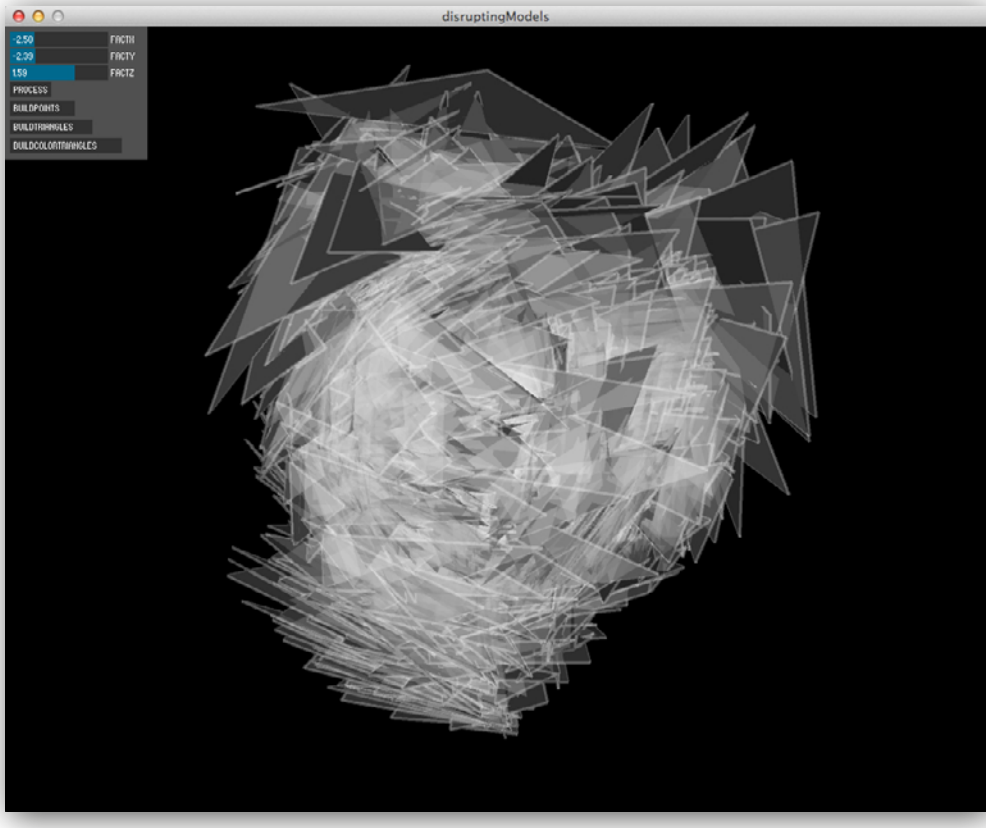
The second piece is called 'Motion Structures'. It was first presented at re-new festival (Copenhagen, 2014). It is basically a script that runs on ImageJ that takes a sequence of images as input and then applies a series of actions to output a virtual 3D model. I have produced motion structures from video sequences (film, TV series, video artworks). The results make evident the trace of movements and transformations that occur from frame to frame in an animated sequence; it is possible to orbit around the shape and to navigate inside it. In order to print a model, its complex geometry had to be reduced from one million to 32,000 faces (fig. 2, obj01.obj).



2/2

My two pieces share in common a non-figurative approach to 3D models. On the one hand, they can be seen as meta-transformations from one media to another; on the other hand, they require an effort from the viewer to experience and provoke variants and reconfigurations. In this respect, the pieces try to drive the attention to the unstable and material part of digital media. Software applications mediate ideologies between people. The processes that we make available through a user interface reflect on choices. But such decisions are pre-configured within the computational environment: the hardware and standards on which our contemporary infrastructure is based. So we have to recall that code is not only electronic: its effects extend to the physical world. Code and digital media are unstable because new uses are continuously foreseen. Design by disruption might respond to stabilizing practices with aesthetic provocations.

Fig. 2



RESOLUTION, REIFICATION AND RESISTANCE: A CONVERSATION WITH CLAUDIA HART

"I AM LIMITED BY MY PROCESSORS. I AM TIME BASED. I AM A GENERALIZED APPROXIMATION OF A PATTERN OVER TIME, AND THEREFORE UNKNOWABLE, ALSO TO MYSELF."

Claudia Hart, ***Mortification 01***, 2007, ABS Plastic rp print, edition of 3

Claudia: With #Additivism you are making a history of something while it's in the making, at the moment when the speed of development seems faster than before. But perhaps that's always the case. That's partly why I wrote to you about the clay printer we just bought at SAIC. Slip printing is a new possibility, but there is very little produced with it at this time that I find of interest.

Daniel and Morehshin: Tell us about that.

C: The clay printer is artisanal, meaning not that refined. It can make big things but in relation to a larger scale, the bead is very very small. It builds the walls of objects, but it doesn't have a sophisticated ability to create fill. What this means is that the things built with a slip printer cannot resist the force of gravity. Slip is heavy with water and slow to dry, so it tends to collapse. You can't stop the printer because it is very bad at returning to the place it stopped. This means you can't heat gun it to speed up the drying process. Plastic printers don't have any of these problems. As a result, with slip printing, smaller works better. So no detail. It's a different problem than plastic printing. Nature has her limits.

As a result of these current material limits, most of us struggle with the so-called authenticity of plastic. In our culture, this means authenticity in terms of traditional pre-industrial materials. Like you and Morehshin, I actually prefer plastic as a material because it is a material for our times. It represents the now. Ironically it is also 'archival', meaning in terms of its longevity it lasts over 100 years. This means that for art, it is a great material. For garbage, not so good, because you can't get rid of it. It sits around in garbage dumps forever!

Art has always been for kings and queens. It's heavy and hard to transport. Art is therefore expensive. So it's always about money. All of us people at the bottom of the economic spectrum, we are not making a million dollars for sale, or even a hundred thousand. So we have this tool which is 21st century, and we have plastic, all we could afford. All of this is fine for me. We look at plastic metaphorically, in the way of a contemporary artist. We don't take anything for granted, our materials speak for us. Plastic speaks about certain things.

Currently, I have access to a slip printer. So suddenly I can use an organic, natural materiaI. This forces me to rethink my relationship to plastic. I never tried to cast my plastic, because I felt that casting missed the point. Plastic is native to the rp-printer. Plastic is native to our time. It is the material of the people. Our garbage dumps are filled will plastic toys and utensils. We can't escape it. It is our new natural. As the natives of 21st century simulations, culture, plastic is our 21st-century necessity.

I consider myself an abstract expressionist of the unnatural. In other words, I am interested in the native, natural states of the artificial. Artificiality, the stuff produced by means of simulations technology, has its own 'natural' mode. You have identified this in The 3D Additivist Manifesto as a kind of pollution in a very funny way. Rp-printed plastic is cheap, and it's supposed to be used to make a prototypes, an interim thing. It's supposed to be thrown out. But the fact is, there's no where to throw it. The plastic garbage dumps live forever, they are killing our oceans. So obviously we should not throw it out. And isn't that what art is? The thing that should never be thrown out?

D: This makes me think about prototyping. Although I completely agree with what you are saying about the 'native' qualities of plastic, and its crappiness, it's also an incredibly versatile material. And that's also why it works for prototyping. It can be solid, fluid, this and that. What you are talking about with clay though, I can't imagine it fulfills the same purpose?

C: Why not? You put it in a kiln.

D: But it's a one way process. It doesn't pretend to be something else.

C: Yes. It's not part of the industrial manufacturing process, but it is archival. In other words, once fired it will last as long as plastic does. Ceramics was the original kitsch material after all. In the 19th century it was used for mass production in imitation of hand made metallic vessels or marble sculpture. So it still goes into a kind of crass thing. It's not mass-reproducible. That's what you are talking about?

D: I went to a 'plastics' conference to talk about #Additivism, and there were many other angles on the material there. But mainly from a design perspective. A conference for people who have invested their careers for decades to using plastic in consumer-level and bespoke products. The designer of the world's first almost-completely-plastic baby carrier was there, a product from the 1980s that sold many millions of units. He dismissed the environmental murmurings in the Q&A session related to the impact of plastic, claiming that ceramics were far more pervasive and longer lasting as a material. It was a very matter-of-fact dismissal of the plastic vs environment question.

C: If you treat ceramics well they will last forever. Otherwise they go to burial grounds, but because made from earth, they return to earth. The other night, in my local Italian restaurant, my waiter shared this story. Hiking in the hills outside Chicago, he stumbled across a Native American dump site, from the 18th century, for broken clay pots. It was a pit filled with shards in a ravine, overgrown with trees and woodland. It had returned to the earth.

D: Of course. After passing through what we call the stone age, and the bronze age, we are now living in the plastic age. That is what will remain of our time. That's the material future generations will label us with.

C: But is printing about the plastic, or is it about the printing? One of the things that interests me is the aesthetics of simulation. Not just the materials. Simulation is based on a mathematical model, an approximation of the real rather than a belief that one is capturing a ghost of the real based on the physical qualities of the photographic process. We are all Platonists here, right? We assume a mathematical model of mind that precedes reality. I assume that my powers of observation are limited by the size of my processors, which are limited. Mathematical models are generalizations necessarily, they are patterns that occur over time in the time/space continuum for simulating the real. The world exists but we can only model it, or approximate it on those models. Plastic is secondary to me. The world is secondary, I am limited by my processors. I am time based. I am a generalized approximation of a pattern over time, and therefore unknowable, also to myself.

D: You have been saying 'we' a lot, talking in retrospect, but also in the present tense about these processes and practices. Can you say something about the 'we'? About who you are referring to?

C: That's a very good question, because a lot of my practice came in isolation. I was thinking a lot of these things by myself, but I wasn't not very articulate about it. When I came to SAIC in 2007, I entered a Phase II. At SAIC, I had access to expensive RP machines and to a more limited extent, CNC routers. I also had students. So students and I compose the 'we'. When I first approached the rp plastic printer, only a couple of guys in the design department, native Rhino software users who only used generalizing nurbs geometry, knew how use the printers. They used nurbs, because their mission was to make simple, manufacturable consumer products such as teapots or cups. But my students and I are artists. We make sculptures that are, among other things, metaphors for manufacturing. We make limited edition objects. Our needs are different. We use polygons, because they permit irregular forms. We tend to want to wreck havoc on consumer products, to rethink possibilities. I want to fuck up consumer products. They are useless in a banal empty way. I

want to make art, which I think of as a more profound useless object. In 2007, there was nobody else at SAIC who wanted to do that.

D: So the 'me' became a 'we'?

C: Yes. But of course there were strings attached. There always are. I had access to the machines as a teacher who was expected to develop curriculum for an art school with my discoveries. This curriculum is meant to attract students and make money for the school. So far so good. But no free lunch. Ben Stagl, an artist and one of the co-founders of the Chicago industrial design group, Chilab Design Studio, was one of my first students, one of my first partners in crime. He was as interested in fucking with the machines as I was. So we did.

M: And of course gender-wise you were one of only women working in this area? How does that include the 'we'?

C: Of course. I have been thinking about this really deeply, you know, your question: who is the 'we'? In my world, I think of my constituency as my students. Many also became obsessed with this area of research. They are now important players on the digital art scene. They are your generation in fact!

So today, many more people work on the issues that I care about, not just 5 or 10 as it was when I arrived at SAIC a decade ago. Over the course of the past ten years I have many more people to talk to, as we talk now. But my 'we' also happens to include women of all sexual persuasions, people of colour, and gay men. Of course I'm in academia, and maybe the straight white dudes have more options, including of going into industry, as a means of to tools and to money. But for my 'we', we have less opportunities there than in liberal humanist academia. So again, with technology, the deciding issues are of class, access to money, power, and expensive tools. It's very consistent.

D: Turning back to metaphors in relation to that, I'm thinking about the written work of Hito Steyerl, especially her essay 'In Defense of the Poor Image'. The idea of a value system predicated on how fast and far an image travels, rather than on its resolution content, its size, its appeal to verisimilitude. There's a politics inherent in the informational constituents of an image. It feels like there's a relation here with what you're saying about additive technologies. A resolution politics of physical processes from digital practices. Maybe the 'we' that you talked about, if I can use the term, are those who are more 'disaffected', they are not the white male, they are not going to be industry leaders, they are on the outside of the sphere, but maybe there is something in the low resolution, the crappy, that evokes some kind of affirmative identity for them. There is an aspirational quality to that, in that the politics of 'crap' is always already in opposition to the establishment.

C: Yes. That relation is made apparent by all simulations technologies: the will towards verisimilitude. Over the course of time there has always been a human obsession with recreating the real. There's an innate seduction to it. Anybody involved in simulations processes are driven by it, whether we make low res versions of it or high res versions. The drive to verisimilitude is actually a reflection of the Freudian idea of the Unheimlich, that eerily familiar thing, that land of the dead, the thing that comes out of your memory, that you feel just might be a ghost. Simulations seem real, but at the same time they are dead. Being both dead and alive is what we humans crave: to never die. We know we have to die but we hope we can trick death. We therefore crave VR spaces in general.

Virtual spaces are what the anthropologists of of religion call 'liminal'. Liminality is a halfway transitional space, the space of ritual and a space of transformation in rituals, where participants pass from the real world into the spirit world. The spirit world – Heaven in Western terms – is the site of the infinite, a place where we imagine we can we can dwell in our bodies, half way between the real world and the big nothing, somehow living forever in our current form, both dead and alive. That is exactly virtual reality.

What fascinates me about the slip printer then is its inherent liminality. It's a paradoxical machine, somehow doomed for failure. It's a liminal machine that can be both/and – producing things that are both dead and alive. Organic yet systematic. Failed perfectness with an almost incomprehensible failed system governing it yet collapsing due to the force of gravity, in a strangely systematic way. New media generally produces liminal states and forms. The people who are attracted to unformed media anyway tend to be people who crave the liminal. We have different needs from those who chose traditional media. For me, creativity occurs at that very the point of improvisation, of newness, when there is not yet a system of overly determined rules guiding me. Maybe I would have been a different artist if I didn't feel that way. I might have been Tony Craig! Nevertheless, I still told my husband, the media artist Kurt Hentschlager, 'Now I have a ceramics printer! I'm finally going to make some money!' [Laughs]

Claudia Hart, *Brides*, 2010, ABS Plastic rp print, edition of 3

Claudia Hart, *Teddy* , 2010, ABS Plastic rp print, edition of 3

D and M: [Laughs]

C: He told me, 'No you will NOT. You're always going to do the things that are somehow threatening, so buyers won't want it.' Kurt is referring to the fact that collectors who invest in art as one might invest in the stock market don't want to take deep risks. At the moment, they don't want to buy things that reflect the improvisational possibilities of machines. That's way too weird and liminal. Things that suggest that machines might be dead and alive at the same time are weird! And for the most part, collectors DO want to reap profits from their art investments in their own lifetimes. For me it's all about emergence somehow. I am a risk taker. I like to gamble on the future. But my idea of the future is historical. I was educated to be an art and architectural historian not an artist. My idea of the future is some time in the future when I am dead, not the now. It's a complex of things about death all tied up in a knot.

When I came to Art Institute 9 years ago, I looked at the 3D printer like I look at the slip printer now. I thought 'I'm going to figure that one out.' At that time, nobody had intentionally made such dirty, nasty forms for rp printing. SAIC hooked me up with the designers of the software running their machines. I chatted with them. They told me, 'You're going to have to eliminate the manifolds', meaning make a form without what I call 'pretzelization'. I was on a mission to de-pretzelize, meaning to turn my messed up nasty models into rational airtight meshes. So I devised various techniques using a whole array of shelf softwares. I couldn't find a single one to do the whole job because there wasn't much of a demand for de-pretelizing. Designers wanted symmetry, I wanted irregularity.

I found a medical software used to rationalize the meshes made to clean scans for teeth, for making prosthetic ones. It cost 13,000 dollars a seat! Alan Labb, the Provost of Technology at SAIC actually encouraged me to buy 12 seats for the school! Then I discovered another company in England, Cad-Span, solely devoted to shrink wrapping Sketch-Up models to provide a service for architects to print models used for client presentations. It was a subscription software, just for shrink wrapping, the most elegant I'd seen. With both of these, I could turn a pretzelized model into something printable. I patched them together.

That was a different approach. If you think about Jeff Koons, who has budget, he employs another strategy. He is actually one of the earliest and most significant of digital sculpture producers, though he's not branded as such by the art world. He actually funded a chair of research in engineering at Rutgers University in New Jersey, to solve his specific problems in the production of high resolution sculptural forms. He uses a CNC router. He has a lot of money, so he spent it. It was a very practical decision.

M: The fact that in your work you had to develop all these processes, it's similar to what artists in the current glitch scene are doing in some ways.

C: I have always used off-the-shelf software. All I do is hack and stitch their processes together. This approach necessarily creates a brutality, a 'low-resness'. To me, this is the place where imperfection becomes expressive. When you look at Impressionism, you are looking at the limits of photography – in other words, at the flaws of industrial processes as a form of expression. The avant-garde is to me, the hackingness of it all. I hacked together different tools that together produce an aesthetics of imperfection, that is therefore expressive. To be expressive you need a range of formal possibilities. The world of perfect verisimilitude is seamless. So in my world, opposition to the corporate is the introduction of expressiveness through imperfection. It is the language of the aesthetics of resistance. As you said Daniel, it is a resistance to the perfect, the high resolution, the seamless.

By ripping apart the tools we are using through glitch practices, and hacking production processes in unexpected ways, I offer students techniques they cannot find in commercial tutorials. That is what is transferable in all of my teaching to the 'we', this particular way of thinking about the land of simulations. To use high-level production software as as 'poor' people. You know what I mean? It's the most important thing to me. Seamless art aesthetics, what has come to be the hyper collectible and expensive in the contemporary art world, is what is called 'production art'. Production artists are using the same technology – and it's beautiful what they do – but I don't think it's expressive. There is no resistance in it.

D: All these terms you are using... we are trying to devise a similar toolkit in a way. To open up avenues for resistance. Or to inject resistance into the 3D printer, so as to disrupt the way the establishment considers it. Where the aesthetic and critical meet.

C: And there's that 'we' again! I make a living talking to other people who are interested in art as a form of resistance. That is the true 'we'. Although it's not as many as there are painters, there are enough of us to have a lively discussion, which wasn't always the case. We are a think-tank! We think of points of resistance

in corporate tools, the point where art and expression come in. In fact, I showed your Manifesto video to my classes recently. It scared them. It's dystopian! It's very dark. But they also loved it. We need you in Chicago!

D: This is why residencies like Pier 9 at Autodesk has amazing people like Morehshin. She finds the gaps in their tools and they extract value from that. That's one of the fundamental politics embedded in the glitch scene. The failure and gaps they exploit for aesthetic and critical results will eventually be bugged, patched up and recuperated by the corporate entities that develop the hardware and software.

C: Which is good because we still get to make art and sustain ourselves in the meantime. But nevertheless we stay moving targets. Once corporations recuperate our techniques, we don't want to do that very thing that we did with them any more. We move on to the next one.

D: Yes. That's real resistance.

C: And that's the interesting part for people working with these technologies at the bottom of the pile. As simulations technologies keep moving towards higher and higher resolution, what we do is always at the interstices. Finding a place where you can hack the system is where the creativity and expression comes in. Where you can use the hack to express more humane, less corporate ideas. Then it doesn't matter that the technology has moved on. The point of the initial hack is no longer important if it remains expressive.
When we look at the kitsch 19th century paintings in museums, we now laugh at them. But we don't laugh at Seurat. Even when we don't know the stories behind his work. Campness is obvious because it denotes a thing that is empty. One can feel that emptiness. Its emptiness resonates. Koons harnesses that emptiness to make comments about Capitalism in fact! His sword is double edged.

D: It's important to have these discussions at this present time. Around these new tools. Just as it has always been important.

C: The process of history is actually a process of reification. The Apples of this world began their life in opposition to the Microsofts, offering a line of resistance. But Apple became our current high-resolution Microsoft. Apple reflects the problem of success and reification. So similarly, now we have the United States, where once we had Britain. The resistance, reified. That's the process of history. The 'special relationship' is actually that 'we' are now 'you'.

D: This is one of the things we have tried to consider with The Cookbook. To mark that line of resistance somehow whilst being aware of, whilst expressing, our own limits. Trying to speak to the outside, or gesture to its possibility, without reifying that space.

C: That's a conscious thing that all artists can do. To talk to your culture and say, 'I'm resisting you.' What you're really saying is 'I'm here, and between you and I, I think we suck.'

D and M: [Laughter]

C: But that's just between us, okay?

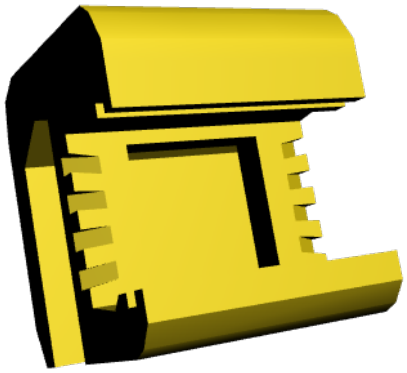
Jasper Meiners and Isabel Paehr	The Webcamera Obscura	2016
Name	Project	Year

#toolkit	#resistance	#remesh
Format	Theme	Action

A masking device for laptop webcams that can be used to rewrite, reform and re-invent the images and private spaces that are accessed by one's online observers

THE WEBCAMERA OBSCURA

1/2



What is The Webcamera Obscura?
The Digital Age is a time of autonomy, liberation and connection, however; this comes at the cost of personal privacy. The Webcamera Obscura is a simple tool that helps reclaim privacy within the age of mass surveillance. It is a masking device for laptop webcams that can be used to rewrite, reform and re-invent the images and private spaces that are accessed by one's online observers. The socket allows one to be seen through imagery of one's choosing such as vellum, transparencies, plastic, film or darkness. One could make observers look through the drain of a 3D printed toilet or filter themselves through the softness of flowers.

Your Webcam is Yours!
The act of monitoring individuals or groups of individuals objectifies people or worse, assumes that they endanger the status quo. Though this threat may encourage us to protect our privacy by hiding in the digital underground: Your webcam belongs to you! *The Webcamera Obscura* encourages one to continue to participate in telepresence as an empowered observed individual – this means setting one's own terms for being seen and developing a personal visual voice.

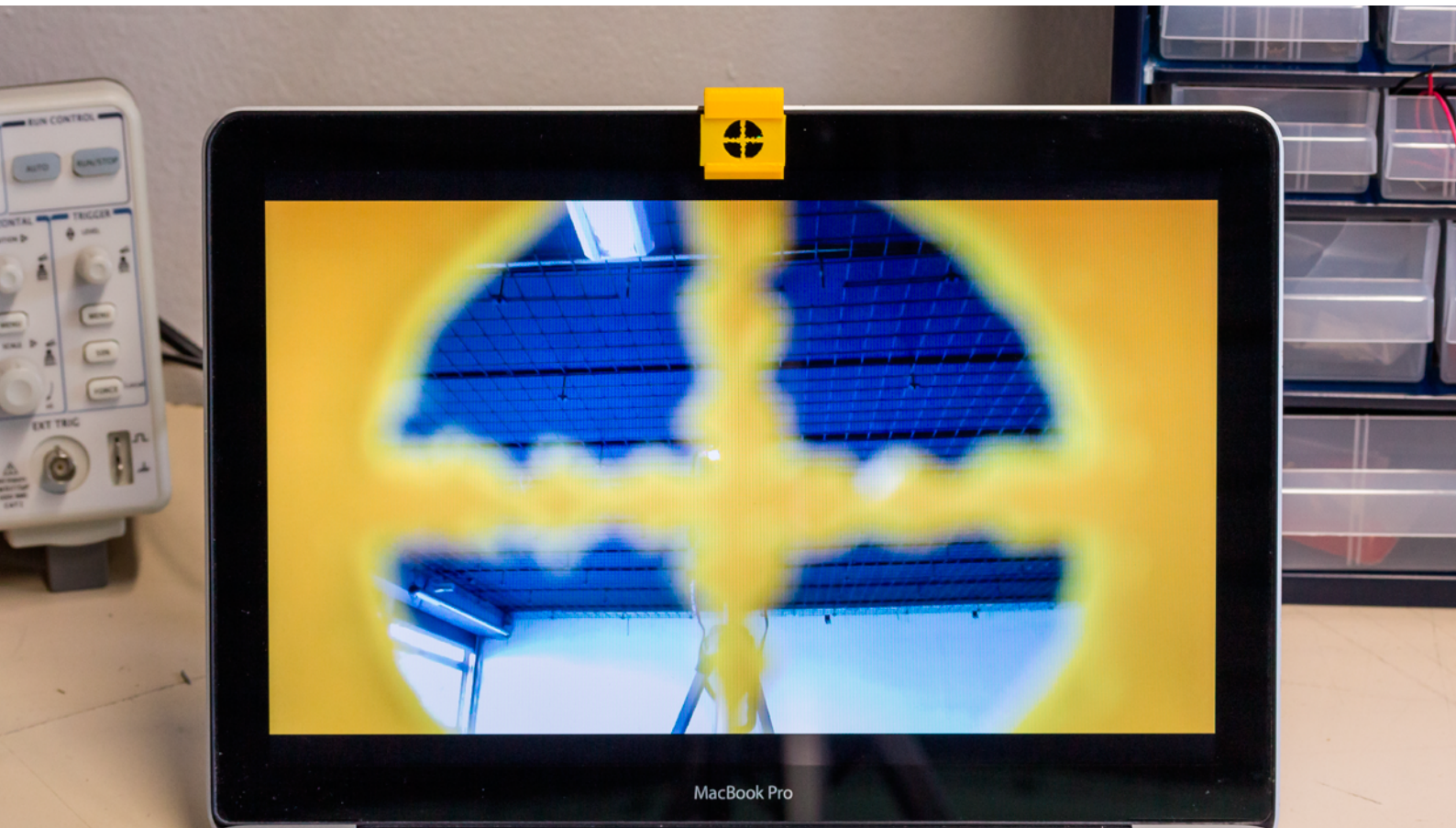
How To:
The basic *Webcamera Obscura* is designed to fit a Macbook and most modern laptop monitors – the .stl can also be modified to suit your PC dimensions needs. You can then modify and / or print modules to shift into the basic socket.

- The basic Webcamera Obscura is called 'webcamera_obscura'.
- The basic module is called 'webcamera_obscura_ blank'.
- We used .svg-files exported from Illustrator (save as : .svg) to cut out forms.
- In Blender: Import .svg, in Object Mode > Object > Convert to > Mesh from Curve, then move your Mesh into the Plate-Object so they overlap, next in Object Mode use the modifier 'Boolean' for the Plate, Operation: Difference.
- Within the modifier you can choose the mesh.

Instead, you can also use .svg-files with your own models (the principle is the same).

Once the Webcamera Obscura is printed, the frame of the basic socket is yours to play with. You could use our examples: The blank, the toilet, the camera, the crosshair, the heart and the customizer. The customizer can hold any material you like to experiment with: flowers, paper, trash, letters ('back in 5 mins'), reflecting material, mirrors, lenses etc. We will continue to create new Webcamera Obscura Images, show us yours: #Additivism #WebcamObscura.

Add and Obscure
Today's activists typically counter surveillance through encryption, anonymous attacks and by completely erasing the image of *the self* from digital spaces. These acts of protecting oneself are natural responses – being observed can create feelings of fear and destabilization. Instead, we would like to encourage artists / activists to turn their measures to maintain privacy into *additivist* actions by adding layers and ideas of their identity and allow them to transform their presence within surveilled realms. The *Webcamera Obscura* subverts this technology used for seeing and being seen by suggesting methods for using it disobediently by recreating what is perceived as private space.



THE MILL CHAFFER O'PRINT HEED

"AN KNOWLECHEN THIS PRINT HEED!"

SAYS THE OTHER,

"GOD BY HIS MERUEILLOUS PROVYDENCE."

Thē X-Y-Z Hi-mak Shoppe at thē Rideau Skywent entrance tae thē Hudson Bay Company also Hosts thē open-heaued reclusorium o' descendre Ylem-stylite an prolapse conceipt-mayster Print Heed. Driven tae outemest lufte-penance by extra-mannish nerve-twangs, Print Heed had maniped skeeletal tree a-bending fi foreheed tae fóta fir thirteen yeer atop garret C o' thē Place de Plasm. Kerne-shocked tae be re-humaned by thē Homliche Organum o' XYZ fi whech hi darked darklyn, he tak tae wyld grazing hot 'n' ready mill chaff in Confederation Park until thē neu Hermit Safari an bi-annual Bi-toon Lik-a-me Sleeve Jaunt Fests for-cursæd him unto a purtenaunce cell in thē unergroon kartorium o' Rideau Centrum.

Tae proper end thē psychic additions o' ungraspable weorld an tru bi-come a blastet oot plumpf-tum he hungen his lika-me in AnaliscanTM wardrobe until thē crawe-bones de-breken an full twin no-mobile unlika-me wis achieved. In thē Hi-mak Shoppe booty room he noo sits in his mecha-prosthesis governailed by a wand-O-physic twischand by tong-flix an wange-toothe. Thē huddy-peke, one-fold plumpf-maysters

stoke his weolcne-migraine wi steoren saturated parchment scrips. Gallerie allure-acateurs refract his eȝe-pouren throu side-dartin, oh-no-shit-shit eyes. Kopf-klamors impede thē pos-parlatorium wi nuf-giffe o' pop gale-gale fellows.

As ȝou approach Print Heed ȝou ouer-sen thē tab-boke o' its lappy. It is no sum 'Boke of Print Heed' but a boke mad o' thē bone-skyne o' Print Heed an containeth thē idee o' Print heed. It is not ȝour boke (sum 'boke of ȝou') but a boke mad o' ȝour bone-skyne an containing thē idee o' ȝou. As ȝou mak ȝour marks, thē marks ȝou mak an rede are ȝou in this boke. ȝou are boke and i-maks. This is ȝour skyn an bone, liver an brain. ȝou an ȝour X-weorld an Y-weorld an Z-weorld are thē marginalia an thē marginalia is corpus (plumpfed lika-me) wi aw comyn corpuses (plumpfed lika-they) o' solid stool Makar empressions (permissions rede an wryte =

xyz-mak-ed). Thē plumpf scribes hath multi-verso that evolve in Bible poblem trend sequens but not lite pattern nor up/down or T-type life rebel. No bow erection but amal-gaming o' core-darklyn and sem-babel. O' Jes us three verso, A, B, D, ȝu an alle-dinge enformyed. A is relative short, B is most comyn verso, an C semen tae be xyz axix-mak o' B, tho B verso existit wi som o' thē C delany-matere, thurghout. It is comyn gree that C is thē moyste noteful an lusti PKDick Heed verso. It wis thē moyste verso that enformyed thē first prynted verso an i-mak ȝu MODERN seolfie.

An so it geht.

Thē plumpf-scribes were lazer blaste-gifted special suite-fley Print Heed germ partikens unloosed as Ylem gas. Scrambled for, an frenzy vialed wi stopper an latin-labels, Print Heeds frayin mesh wis punker by three-fold (X,Y,Z) than aw boke-massif encorpsife! It wis bi-smeoruwed an en-firmed wi wroth, plastik-glans an wicked wille, wi inflatable envy an alembyk sprache-gramme enticing tae co-arten, eȝe-lying, lack-mimy an lief tonge fir plumpf sex an all fir licke-penny an trend humastic after-clappy.

'A museum o' maggots that gnaws God wi thē plastic-gorge when thē guts fu. This doctour on thē high daïs drunks wyn fest as transfigured fi plumpf-monkish piss. He Hi-mads look-only dis-plays o' sundry plasmeats, mortrews an pud dings, womb clouts an wild braun an display eggs X-Y-Z-fried an ets them up whan were awa tae bed. An then shall his guts gothele, an he shall galp efter. For noo he hath drunk so deep he will semen by Plumpf-trend thingy apocalypse that nether bacoun, nor braun, nor blancmange, nor mortrews, fish nor lika-me is fod for a penitent. A richt flaunt-a-flaunt o' sigaldren, tele-wood craft an nigromancye so he is', was sed by ȝu.

'A-flaumbe, ma chattel wilst thee, thy protesting moder!' cryed Print Heed noo thrustin thē action tank at thē eȝes o' himself. But than Print Heed

ouer-sen an smelt som maple bacoun thurgh-girt thar on thē end o' it seolfie-stick an his mouth flode wi lusti sleaver. Thē universe flattened, abstracted an contracted an at thē exact geometric center o' its plane flooten thē X-Y-Z-baken tidbit o' weorld-brede. A game-gobelyn commanded his lymme-muscles tae fleen but instead forced his tonge tae say thē prosthesis tae sprung a grabber an teste thē gid chaud mod fodder. A wild uggynge passed ouer Pint Heed's un-deed body. He closed his eȝs an sehen in thē midst o' swety napalm smok, thē stingy eȝs o' thē canook Martyr McLuhan a-gastin in death-angers ouer his paraplegic protégé cought in thē act o' rechen for hogless bacoun-bit.

'Smash thē waferer!' hissen Print Heed's mouth, lika ventaculum butt o' heretic when a-slepe on-fire. He tonge vor-priked his lika-me chairiot violently over an strenkyl thē devilish Walker wi mare Guilty-Diamond pukked fi couert waterbulge. Thē mecha-Print Heed failed tae total explod intae vial-syuff, or intae loose story-glyph but turned a glaren shad o' crimson an lunged at Print Heed wi a blode-curdling yoller. Print Heed kept stalling his plumpf deck as he fled fi thē flailing o' mecha-Print Heed's bacouny seolfie-staff, an he escaped witout MODERN holes only bi-cause thē relic-chasin leeper-pylgrym wis areedy Jaunted and for-goose trend plumpfed.

'An knowlechen this Print Heed!' says the other, 'God by his merueillous provydence, fir thē X-Y-Z Hi-mak o' Weorld, cake-cutt knowleche o' mecha-vicars for thē abolishynge o' flaunt-a-flaunt an Idol after-clappy! So as in these oure X-Y-Z dayes, we may wel cock-lock wi' fleshly-effect escalate traction contract that spore eruptive meta-fak or jiggle-grasp Christos coulde neer hae bene kept doon, except this mayste menskful comyn-mynnyng an glyph-diffamen had bin keep-haunten, wherby thē sham full ypocrysie o' ȝOU is cutt Print Heed an noo X-Y-Z tele-diffameden live ouer thē whole Weorld an Domes-man truthe be cut oot, herde-baken an frakly avaunset!'

Jornay-docteur Print Heed (that is ȝOU) aryven in X-Y-Z Hi-mak Shoppe wi yer swikel raggs an gleo-beame brede sculptilis. Aye, gid fur un-bi-come but wi seolfie-diffamen. Shew Print Heed (that is ȝOU) if ȝou can, ony poynt o' aw thy Hi-mad plumpf thinges whichin ye strive for quiddities o' Soule, Entencion, Mynde, Memo, Resun, Sens, Lofe, In-wit an Elan-Sprite but are altegether encorsife an externe fod-matters an un-clense enchauntements o' siȝe-craft. Nae kyn o' hali-gast neo-minde jobby shyrnes (the modesty cubicles, ceramic graves, oh my, oh my etcetera, etcetera!)

A
wwww wheche thinges abouen recited conteine thē hool googleum an efecte o' aw thē mod weorld X-Y-Z Hi-makar groupes: so are they aw lika-me exerce, anthro consistin o' thē externe operate o' replumpf huma eighteen+. But noo thē order o' oor plumpf groupes an wey o' sowle heling consisteth nae in seche lika-me or externe thynge as thos, but in otherweyes more Hi-mad an more trend-sphere X-Y-Z Jaunt gifts whech ouer-cummen an ouer-faren thē mere-stanes o' lika-me an boke-skyne. The fantome multiplicacioun thus hae expounen an non doth protest.

An so it geht.

Julien Deswaef and Matthew Plummer Fernandez
Author

Shiv Integer
Project

2015-2016
Year

#device
Format

#kipple
Theme

#remesh
Action

A bot that inhabits Thingiverse, downloads models and uses them to make random assemblages that get posted back to Thingiverse

SHIV INTEGER

In mid-2015 Matthew Plummer-Fernandez released a bot called 'The-Collector' that automatically downloaded objects from *Thingiverse*, a site for sharing 3D printable models, and challenged Julien Deswaef to make something out of them. Conversations and intense collaboration ensued over the next few months, and *Shiv Integer* was born.

Shiv Integer is a bot that inhabits Thingiverse. The bot downloads models and uses them to make random assemblages that get posted back on Thingiverse. The bot complies with the open licensing granted by the model's authors, only remixing files that are published with the freedom to be modified.

In the beginning Shiv was posting 5 to 15 objects per day. Later, it was slowed down to roughly 4 objects a day. Shiv generated a lot of comments during the first 2 weeks, when all its creations were still appearing on the front page and in the main feeds. Comments, complaints, reports and reactions dropped when Thingiverse removed all Shiv's publications from the main channels.

Thingiverse was never contacted during the making of this project. Once launched though, employees of Thingiverse quickly got in touch and were very supportive of the project, although they were receiving a lot of complaints and were often asked to ban Shiv completely.

Like an archaeologist visiting a burial site, the bot makes no value judgments, it amasses all it finds in an assemblage of objects that belong to a shared 'search space'. The objects are carefully collected into folder structures that retain their search-space identity. The bot makes random searches by pulling a word from a dictionary, avoiding the usual 3D print terminology and biases, and instead seeking things that answer to diverse words such as 'insertions', 'fasteners', 'till', 'example'.

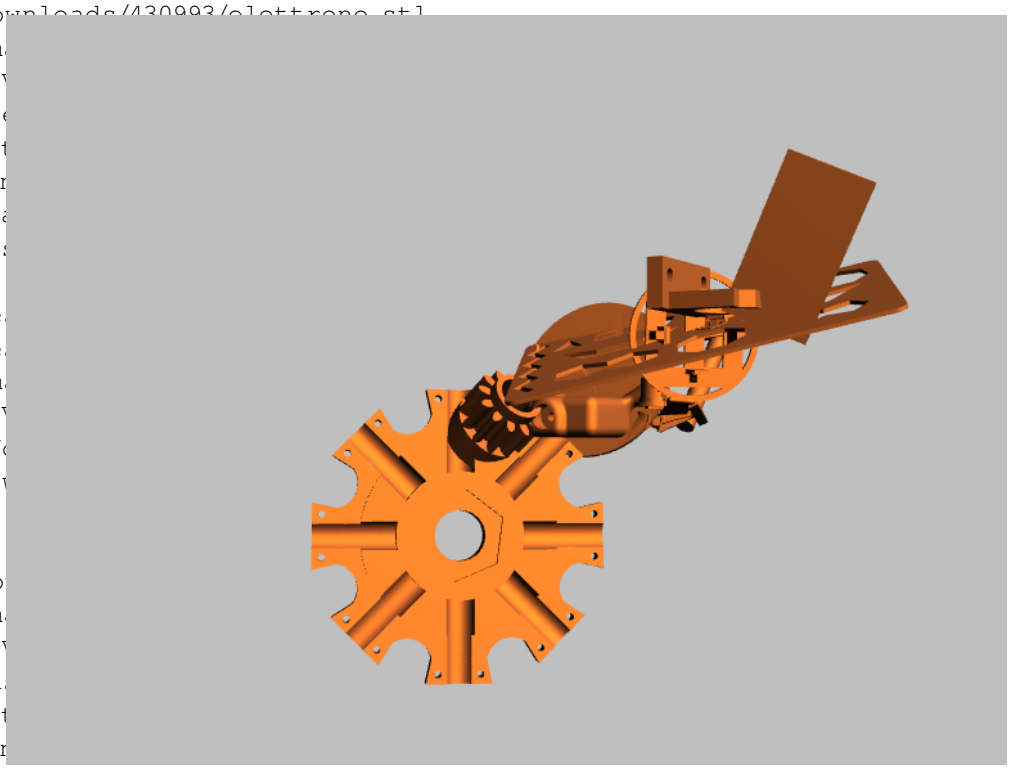
1/5

The bot still needs some work. It only downloads STL files for now. This can be fixed. One method would be to download the zip file with all the files in it instead of individual files. To specify what file formats it should take, you need to find the MIME type for each file format and add it to the list inside the main python file.

Also it logs into a Thingiverse account so get one of those and put your account email and password in the settings file.

[+] Built in Python
Dependencies: Selenium Firefox Beautiful Soup randomWords

```
[+] Getting object #0
[+] No STL in that folder

[+] Getting object #0
[<] Importing : downloads/868658/D1600DashLEDHolderIndicator1.4.stl
[+] Cleaning non manifold
[!] Total removed V: 0.00%, E: -0.52%, F: -0.77%
[+] Preparing : D1600DashLEDHolderIndicator1.4

[+] Getting object #1
[<] Importing : downloads/430993/elettrone.stl
[+] Cleaning non m
[!] Total removed
[+] Preparing : El
[+] Rotating object
[!] Volume differe
[+] Created duplic
[+] Staging object
[+] Union between
[!] Number of face
[!] Number of face
[+] Cleaning non m
[!] Total removed
[-] Object is malf
[-] Union did not

[+] Getting object
[<] Importing : do
[+] Cleaning non m
[!] Total removed
[+] Preparing : Bu
[+] Rotating object
[!] Volume differe
[+] Scaled Buster Sword by 592.63%
[+] Created duplicate : D1600DashLEDHolderIndicator1.000
[+] Staging objects : BOTH_RIGHT
[+] Union between : D1600DashLEDHolderIndicator1.000 & Buster Sword
[!] Number of faces #1 : 899 + number of faces #2 : 5496 = 6395
[!] Number of faces of union: 6414
[+] Cleaning non manifold
[!] Total removed V: 0.00%, E: 0.00%, F: 0.00%

[+] Getting object #3
[<] Importing : downloads/23999/airport-proof-buckle.stl
[+] Cleaning non manifold
[!] Total removed V: 0.00%, E: -0.04%, F: -0.05%
[+] Preparing : Airport-Proof-Buckle
[+] Rotating object = Airport-Proof-Buckle
[!] Volume difference is 149.42%
[+] Created duplicate : D1600DashLEDHolderIndicator1.001
[+] Staging objects : BOTH_BOTTOM
[+] Union between : D1600DashLEDHolderIndicator1.001 & Airport-Proof-Buckle
[!] Number of faces #1 : 6414 + number of faces #2 : 8909 = 15323
[!] Number of faces of union: 11211
[+] Cleaning non manifold
[!] Total removed V: -0.02%, E: -0.01%, F: -0.01%

[+] Getting object #4
[<] Importing : downloads/33028/druplicon.stl
[+] Cleaning non manifold
[!] Total removed V: 0.00%, E: 0.00%, F: 0.00%
```



Datsun merged with signal signal

2/5

```
[+] Getting object #0
[+] No STL in that folder

[+] Getting object #0
[<] Importing : downloads/1050693/message_ring_customizer_20151003-25888-199ciu1-0.stl
[+] Cleaning non manifold
[!] Total removed V: -0.12%, E: -0.12%, F: -0.12%
[+] Preparing : Message Ring Customizer 20151003-25888-199Ciu1-0

[+] Getting object #1
[<] Importing : downloads/1157610/SLJ_Final-8cm.stl
[+] Cleaning non ma
[!] Total removed V
[-] Object is malfo
[+] Deleting bad sc

[+] Getting object
[<] Importing : dow
[+] Cleaning non ma
[!] Total removed V
[+] Preparing : Gri
[+] Rotating object
[!] Volume differen
[+] Scaled Gripz.00
[+] Created duplica
[+] Staging objects
[+] Union between :
[!] Number of faces
[!] Number of faces
[+] Cleaning non ma
[!] Total removed V

[+] Getting object
[<] Importing : downloads/1178037/Tree_Stand.stl
[+] Cleaning non manifold
[!] Total removed V: 0.00%, E: 0.00%, F: 0.00%
[+] Preparing : Tree Stand
[+] Rotating object = Tree Stand
[!] Volume difference is 375.34%
[+] Created duplicate : Message Ring Customizer 20151003-25888-199Ciu1-0.000
[+] Staging objects : BOTH_RIGHT
[+] Union between : Message Ring Customizer 20151003-25888-199Ciu1-0.000 & Tree Stand
[!] Number of faces #1 : 1907 + number of faces #2 : 7142 = 9049
[!] Number of faces of union: 8938
[+] Cleaning non manifold
[!] Total removed V: 0.00%, E: 0.00%, F: 0.00%

[+] Getting object #3
[<] Importing : downloads/892751/coin_20150622-13780-11rg713-0.stl
[+] Cleaning non manifold
[!] Total removed V: 0.00%, E: 0.00%, F: 0.00%
[+] Preparing : Coin 20150622-13780-11Rg713-0
[+] Rotating object = Coin 20150622-13780-11Rg713-0
[!] Volume difference is 5.35%
[+] Scaled Coin 20150622-13780-11Rg713-0 by 123.17%
[+] Created duplicate : Message Ring Customizer 20151003-25888-199Ciu1-0.001
[+] Staging objects : BOTH_LEFT
[+] Union between : Message Ring Customizer 20151003-25888-199Ciu1-0.001 & Coin 20150622-
    13780-11Rg713-0
[!] Number of faces #1 : 8938 + number of faces #2 : 2240 = 11178
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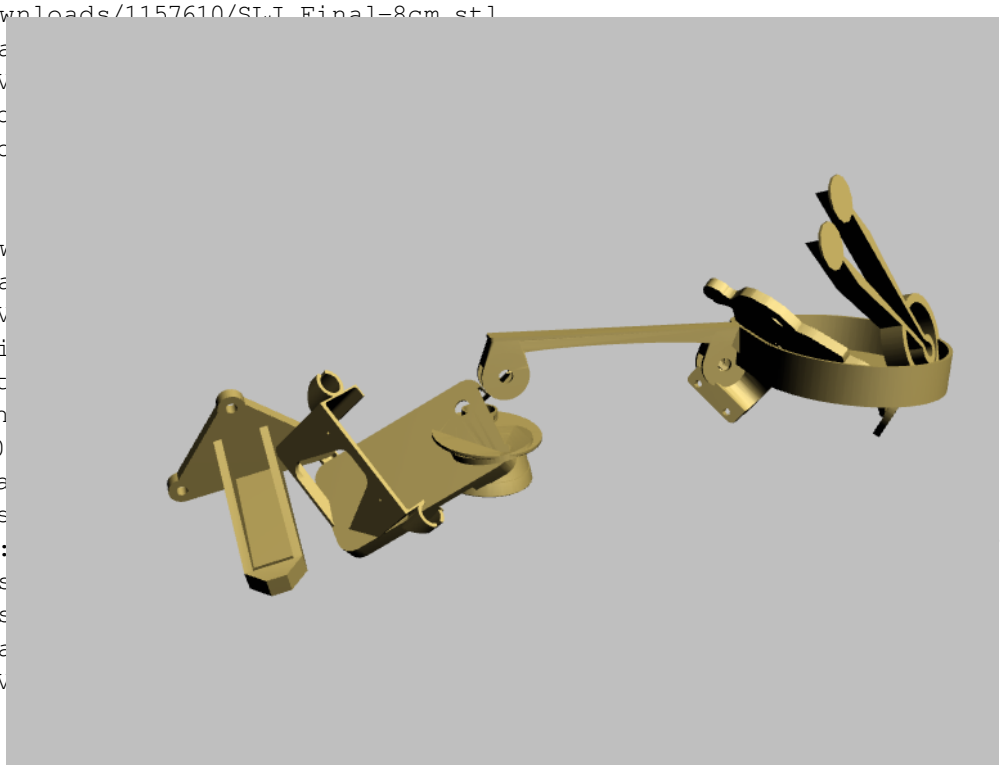

Holder and a portable Base

3/5

```
[+] Getting object #0
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[+] Cleaning non manifold
[!] Total removed V: 0.00%, E: 0.00%, F: 0.00%
[+] Preparing : Independenceday Cyba

[+] Getting object #1
[<] Importing : downloads/424410/keyPrism.stl
[+] Cleaning non manifold
[!] Total removed V: 0.00%, E: 0.00%, F: 0.00%
[+] Preparing : key
[+] Rotating object
[!] Volume differen
[+] Scaled keyPrism
[+] Created duplica
[+] Staging objects
[+] Union between :
[!] Number of faces
[!] Number of faces
[+] Cleaning non ma
[!] Total removed V

[+] Getting object
[<] Importing : dow
[+] Cleaning non ma
[!] Total removed V
[+] Preparing : Mag
[+] Rotating object
[!] Volume differen
[+] Created duplica
[+] Staging objects
[+] Union between :
[!] Number of faces
[!] Number of faces of union: 57
[+] Cleaning non manifold
[!] Total removed V: -12.95%, E: 12.44%, F: 75.44%
[-] Object is malformed
[-] Union did not work well. Discarding object.

[+] Getting object #3
[<] Importing : downloads/882194/marvy_mountain_dentist.stl
[+] Cleaning non manifold
[!] Total removed V: -0.38%, E: -0.43%, F: -0.45%
[+] Preparing : Marvy Mountain Dentist
[+] Rotating object = Marvy Mountain Dentist.012
[!] Volume difference is 0.91%
[+] Scaled Marvy Mountain Dentist.012 by 222.70%
[+] Created duplicate : Independenceday Cyba.000
[+] Staging objects : BOTH_BOTTOM
[+] Union between : Independenceday Cyba.000 & Marvy Mountain Dentist.012
[!] Number of faces #1 : 9082 + number of faces #2 : 6630 = 15712
[!] Number of faces of union: 15254
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[+] Getting object #4
[<] Importing : downloads/249818/JFK_Bust_-_Bust.stl
[+] Cleaning non manifold
[!] Total removed V: 0.00%, E: -0.00%, F: -0.00%
[+] Preparing : JFK Bust - Bust
[+] Reducing the number of polygons by 84.68%
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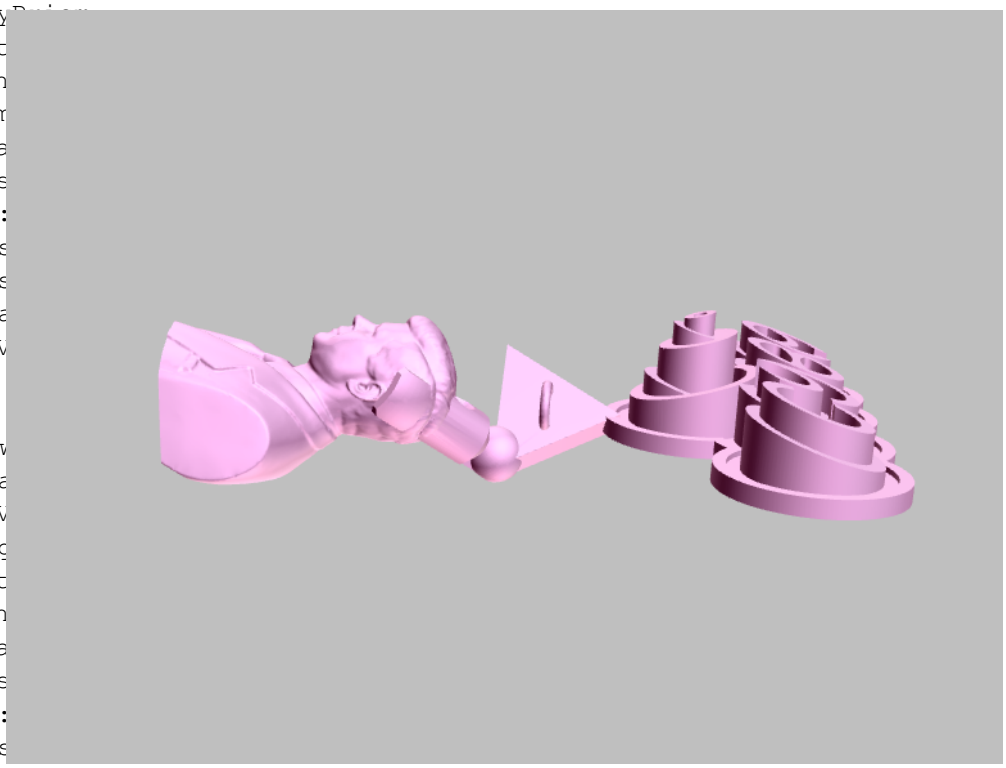

Kennedy off a Dentist ORGANIZER

4/5

Datsun merged with signal signal
by shivinteger, published Mar 1, 2016
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[0] Thing Title : R. Maker – Mark I
[0] Thing URL : http://www.thingiverse.com/thing:11654
[0] Thing Author : Mr_MegaTronic
[0] Thing Licence : Creative Commons – Attribution – Share Alike

[1] Thing Title : 357 Revolver
[1] Thing URL : http://www.thingiverse.com/thing:17352
[1] Thing Author : wgss
[1] Thing Licence : Creative Commons – Attribution – Share Alike

[2] Thing Title : NYLON Windmill Flange to reduce Bird Mortality
[2] Thing URL : http://www.thingiverse.com/thing:23961
[2] Thing Author : Taulman
[2] Thing Licence : Creative Commons – Attribution – Share Alike

[3] Thing Title : Airport Proof Belt Buckle
[3] Thing URL : http://www.thingiverse.com/thing:23999
[3] Thing Author : thebluedirt
[3] Thing Licence : Creative Commons – Attribution – Share Alike

[4] Thing Title : OpenSCAD Druplicon (a.k.a. the Drupal logo)
[4] Thing URL : http://www.thingiverse.com/thing:33028
[4] Thing Author : sponnet
[4] Thing Licence : Creative Commons – Attribution – Share Alike

[5] Thing Title : Randomized Circular Gallifreyan Coin
[5] Thing URL : http://www.thingiverse.com/thing:46889
[5] Thing Author : laird
[5] Thing Licence : Creative Commons – Attribution – Share Alike

[6] Thing Title : Anti Splatter paper bowl cover
[6] Thing URL : http://www.thingiverse.com/thing:65353
[6] Thing Author : tmorris9
[6] Thing Licence : Creative Commons – Attribution – Share Alike

[7] Thing Title : Bird Spikes for Imperial Mailboxes (2014 Version)
[7] Thing URL : http://www.thingiverse.com/thing:368554
[7] Thing Author : TinmanTechnology
[7] Thing Licence : Creative Commons – Attribution – Share Alike

[8] Thing Title : Organic chemistry stencil
[8] Thing URL : http://www.thingiverse.com/thing:578346
[8] Thing Author : mattiles
[8] Thing Licence : Creative Commons – Attribution – Share Alike

[9] Thing Title : RF Explorer Stand
[9] Thing URL : http://www.thingiverse.com/thing:754510
[9] Thing Author : jurnaza
[9] Thing Licence : Creative Commons – Attribution – Share Alike

[10] Thing Title : Buster sword
[10] Thing URL : http://www.thingiverse.com/thing:838370
[10] Thing Author : flameblade
[10] Thing Licence : Creative Commons – Attribution – Share Alike

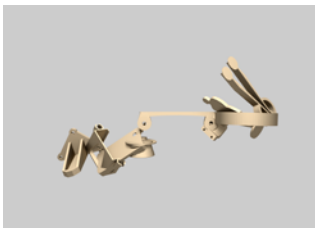
[11] Thing Title : Sintron Prusa i3 MK8 Extruder Proximity sensor and cooling fan mounts
[11] Thing URL : http://www.thingiverse.com/thing:853080
[11] Thing Author : Islewis901
[11] Thing Licence : Creative Commons – Attribution – Share Alike

[12] Thing Title : Datsun 1600 / 510 LED dash light turn signal
[12] Thing URL : http://www.thingiverse.com/thing:868658
[12] Thing Author : trent510
[12] Thing Licence : Creative Commons – Attribution – Share Alike

[13] Thing Title : Mercedes W126 560SEC Digital speedometer pinion gear (12 tooth)
[13] Thing URL : http://www.thingiverse.com/thing:949801
[13] Thing Author : mikesc220
[13] Thing Licence : Creative Commons – Attribution – Share Alike

[14] Thing Title : Sextruder V2
[14] Thing URL : http://www.thingiverse.com/thing:991638
[14] Thing Author : s0up
[14] Thing Licence : Creative Commons – Attribution – Share Alike

[15] Thing Title : Sewer Sluice with floor drain/grate
[15] Thing URL : http://www.thingiverse.com/thing:1023329
[15] Thing Author : Sytar
[15] Thing Licence : Creative Commons – Attribution – Share Alike



Holder and a poratble Base
by shivinteger, published Mar 1, 2016
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[0] Thing Title : Collectable Art Collector Art Toys – Sexyboy Series
[0] Thing URL : http://www.thingiverse.com/thing:27289
[0] Thing Author : CosmoWenman
[0] Thing Licence : Creative Commons – Attribution

[1] Thing Title : 80mm fan mount
[1] Thing URL : http://www.thingiverse.com/thing:95842
[1] Thing Author : Dekker3D
[1] Thing Licence : Creative Commons – Attribution

[2] Thing Title : Solder Spool Holder Can
[2] Thing URL : http://www.thingiverse.com/thing:636275
[2] Thing Author : Paintballmagic
[2] Thing Licence : Creative Commons – Attribution

[3] Thing Title : (New) Maddie Smith
[3] Thing URL : http://www.thingiverse.com/thing:892751
[3] Thing Author : mwhitaker
[3] Thing Licence : Creative Commons – Attribution

[4] Thing Title : TomsRing
[4] Thing URL : http://www.thingiverse.com/thing:1050693
[4] Thing Author : jackarnold
[4] Thing Licence : Creative Commons – Attribution

[5] Thing Title : Grips, a silverware holder
[5] Thing URL : http://www.thingiverse.com/thing:1069011
[5] Thing Author : HeyitsAndy
[5] Thing Licence : Creative Commons – Attribution

[6] Thing Title : Coque poratble Samsung Galaxy Ace
[6] Thing URL : http://www.thingiverse.com/thing:1078011
[6] Thing Author : MATTGEEK
[6] Thing Licence : Creative Commons – Attribution

[7] Thing Title : Tweezers (single print) Type 1
[7] Thing URL : http://www.thingiverse.com/thing:1081911
[7] Thing Author : Simonwlchan
[7] Thing Licence : Creative Commons – Attribution

[8] Thing Title : Trunk and Base for FabShop Christmas Tree
[8] Thing URL : http://www.thingiverse.com/thing:1178037
[8] Thing Author : Badgerous
[8] Thing Licence : Creative Commons – Attribution

[9] Thing Title : Multimeter wall bracket
[9] Thing URL : http://www.thingiverse.com/thing:1222437
[9] Thing Author : RGN01
[9] Thing Licence : Creative Commons – Attribution

[10] Thing Title : Half of a spool holder that uses 608zz bearings
[10] Thing URL : http://www.thingiverse.com/thing:1277500
[10] Thing Author : boredzo
[10] Thing Licence : Creative Commons – Attribution

[11] Thing Title : Valentine Picks
[11] Thing URL : http://www.thingiverse.com/thing:1326744
[11] Thing Author : barb_3Dprintny
[11] Thing Licence : Creative Commons – Attribution

[12] Thing Title : Apple Watch 42mm Mount for Motorbike Handlebar
[12] Thing URL : http://www.thingiverse.com/thing:1341905
[12] Thing Author : And0rphine
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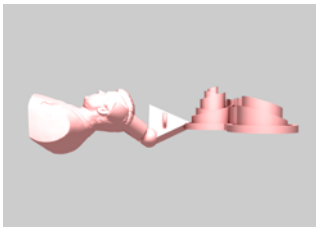

Kennedy off a Dentist ORGANIZER
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[0] Thing Title : Presidents' Day Commemorative – John F. Kennedy (Bust and Plinth)
[0] Thing URL : http://www.thingiverse.com/thing:249818
[0] Thing Author : mtdna
[0] Thing Licence : Creative Commons – Attribution – Share Alike

[1] Thing Title : PRISM ORGANIZER
[1] Thing URL : http://www.thingiverse.com/thing:424410
[1] Thing Author : ThomasR
[1] Thing Licence : Creative Commons – Attribution – Share Alike

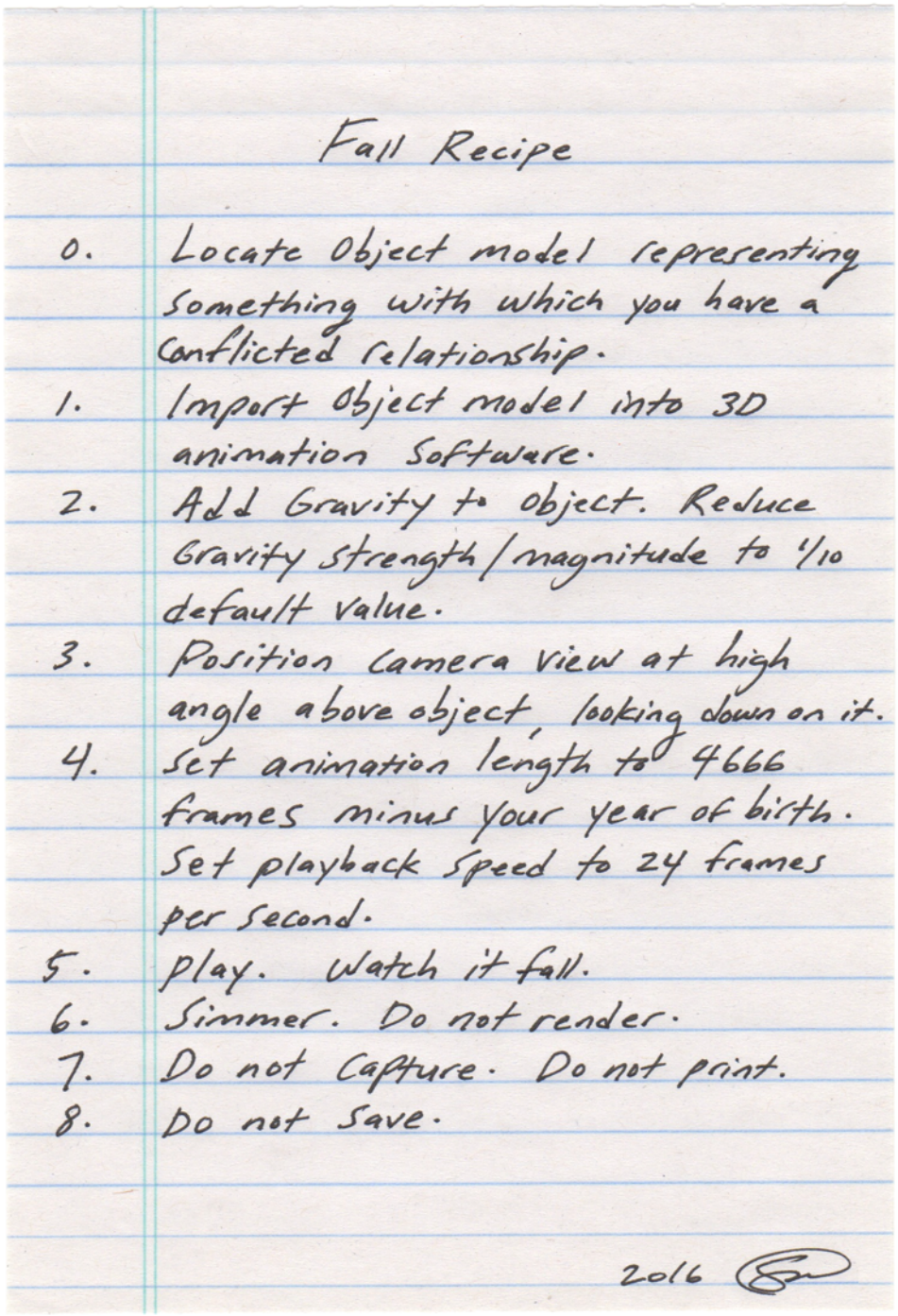
[2] Thing Title : Marvy Mountain Dentist
[2] Thing URL : http://www.thingiverse.com/thing:882194
[2] Thing Author : Maia943
[2] Thing Licence : Creative Commons – Attribution – Share Alike

[3] Thing Title : cyba logo with flag host
[3] Thing URL : http://www.thingiverse.com/thing:969559
[3] Thing Author : cybadigitals
[3] Thing Licence : Creative Commons – Attribution – Share Alike

5/5

Shane Mecklenburger	Fall Recipe	2016	#recipe	#resistance	#detach
Author	Project	Year	Format	Theme	Action

A recipe



Fall Recipe

0. Locate object model representing something with which you have a conflicted relationship.
1. Import object model into 3D animation software.
2. Add Gravity to object. Reduce Gravity strength / magnitude to 1/10 default value.
3. Position camera view at high angle above object, looking down on it.
4. Set animation length to 4666 frames minus your year of birth. Set playback speed to 24 frames per second.
5. Play. Watch it fall.
6. Simmer. Do not render.
7. Do not capture. Do not print.
8. Do not save.

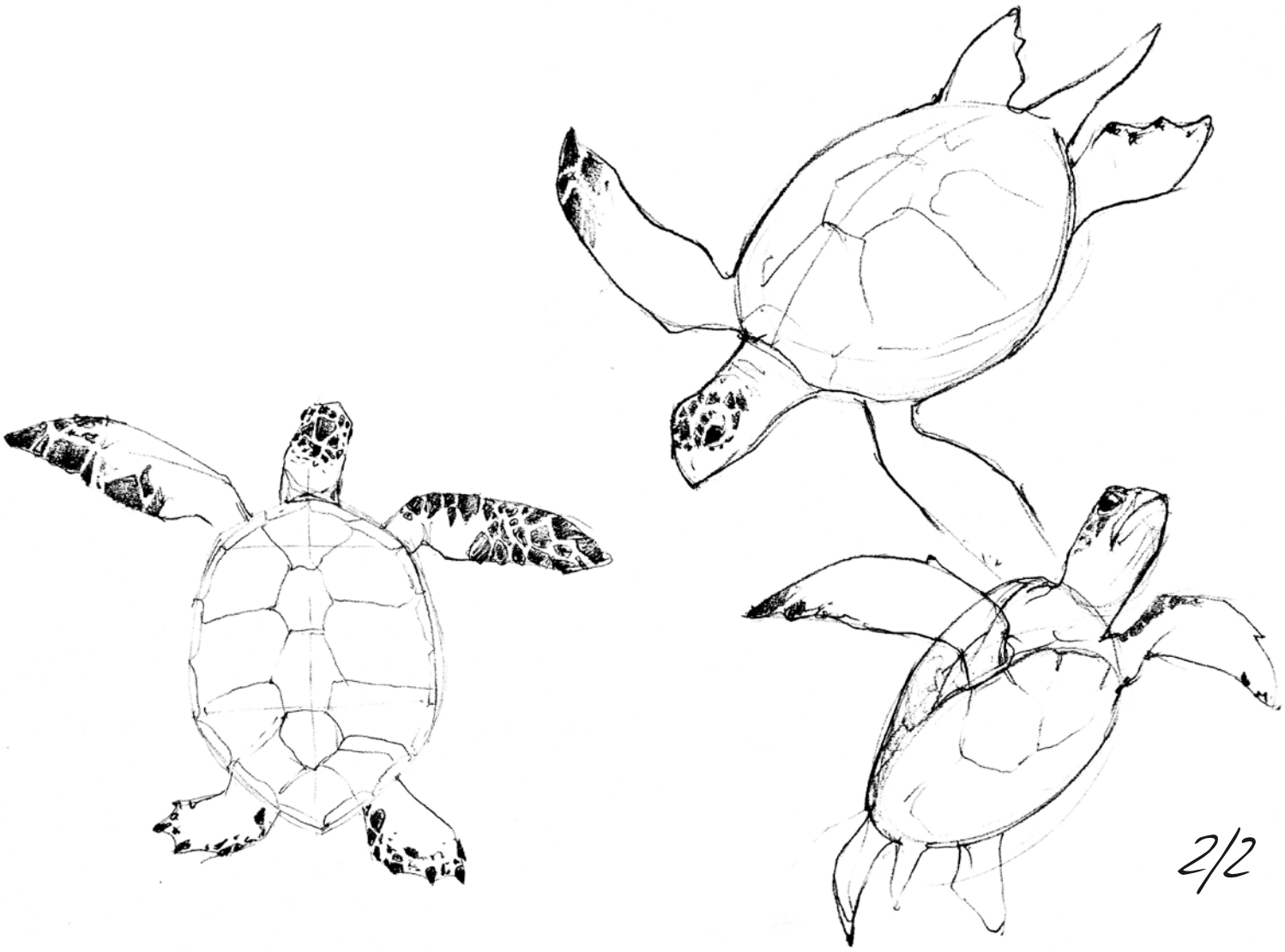
2016 SM

Antonio Esparza	The TurtleBag	2016
Author	Project	Year

#fabulation	#postnature	#remesh
Format	Theme	Action

A 3D printed exoskeleton for turtles that can distinguish plastic bags from jellyfish, in order to enable them to survive in a progressively postnatural world

THE TURTLEBAG



Post-natural limbs for non human creatures: The TurtleBag

In this awakening from naturalism, conflicting views of our choices as humankind appear: should we preserve nature and leave 'things as they were' or should we keep pushing our limits to expand our knowledge of new worlds? Within this conflict between transgenes and nature, between forests and cities, this project suggests the use of additive manufacturing to find a third option for coexistence. By understanding the needs of natural beings and the challenges they face, we can use existing technologies to enhance their capabilities and support their shortcomings against postnatural effects. In the present example, the TurtleBag becomes an extra limb for plastic digestion. The abscess is designed as a second stomach in charge of eating plastic bags before the turtle mistakes them as jellyfish. By separating the bags the turtle has more chances of survival, extending its lifespan.

The TurtleBag is conformed by a skeleton that through plastic muscles compresses a pair of vacuum bags on the top of the turtle's shell. The bags use a pair of one-way valves to swallow plastic bags through a small gap. The entrance valve is activated when the turtle stretches its neck and opens the valve. The turtle bag works since plastic bags are completely compressible while jellyfish are not. The TurtleBag awaits the appearance of multi-material desktop 3D printers. With this technology, the TurtleBag will be printed in just one process accessible even on the most remote of beaches.

The TurtleBag exploits the best unexplored quality of 3D printers: immediate action. Great conservation initiatives usually belong to large international NGOs that function like corporations. Why should we restrict our action to the conservation of our garden or the separation of our 'waste'? Additive manufacturing allows us to create highly complex objects without looking for corporate approval. The TurtleBag is designed to be utilised not by Greenpeace or the WWF; it is designed for the young fisherman who needs to keep a balance in his everyday context. The TurtleBag is an object that enables autonomous decisions for environmental change. Let's design for homeless birds, for intoxicated fish, for bears that have been restricted to small remnants of their habitat. Let's invite them to coexist in a postnatural world.

AN ARCHAEOLOGY OF #ADDITIVISM

"WE SEE FUTURES FOR PROSTHETICS THAT ARE NOT JUST TECHNICAL BUT PERFORMATIVE AND THEATRICAL. WE SEE FUTURES WHERE PEOPLE NOT ONLY GRAFT PRINTED TISSUES, BUT SWALLOW PRINTERS THEMSELVES."

AN ARCHAEOLOGY OF ADDITIVISM

GAIA SCAGNETTI AND SHA HWANG

PERSONAL BODY

EXPLORATIONS IN THIS DIMENSION FUNDAMENTALLY CONTRIBUTE TO OUR IDENTITY CULTURE AND PROVIDE A PLATFORM FOR EXPRESSING OUR PERSONALITIES, PREFERENCES, TASTES AND FETISHISMS. THESE OBJECTS ARE EMBODIMENTS OF OUR DESIRES, OUR CURIOSITY FOR THE TRIVIAL.

IDENTITY CULTURE

GROUP BODY

OBJECTS OF THIS BODY ARE OUR COMMUNAL SPACES AND INTERACT WITH US AS FRIENDS, FAMILIES, GROUPS. WE DO NOT OFTEN OWN THESE SPACES BUT THEY AUGMENT, CROSS-FERTILIZE, AND SUPPORT OUR MANY INTERSECTING TRIBES.

TRIBE CULTURE

CIVIC BODY

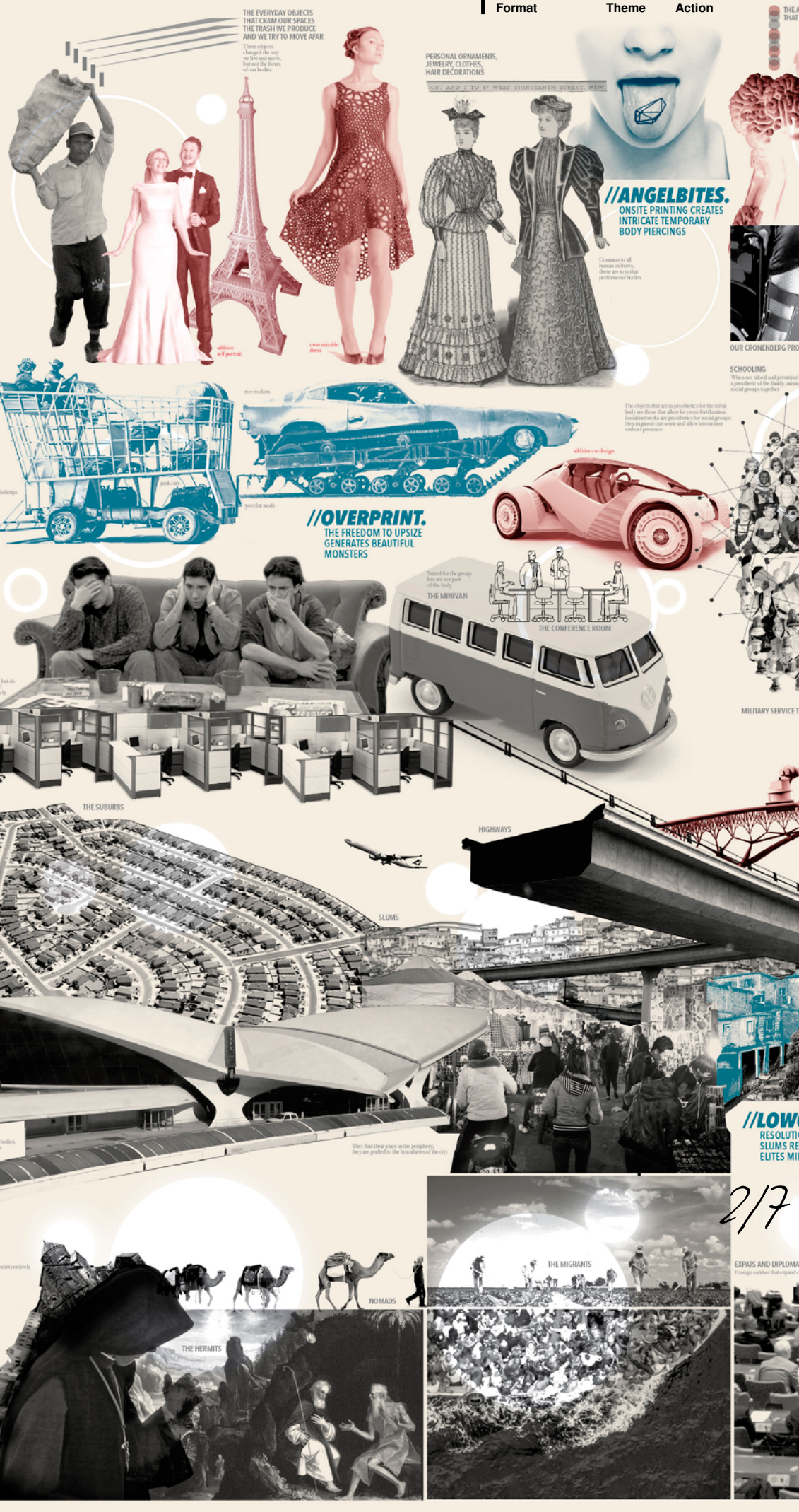
SPEED AND VIOLENCE, STEEL AND STONE. OUR GREED HERE RISES TO THE SKY, OUR SHAME PUSHES TO THE SUBSTRATUM AND THE PERIPHERY, OUR SLOTH UNFURLS ACROSS THE LANDSCAPE.

URBAN CULTURE

SOCIAL BODY

CHANGE THAT HAPPENS HERE REFRACTS THROUGH THE URBAN, THE TRIBAL, AND THE INDIVIDUAL. HERE THERE ARE LESS OBJECTS THAN THERE ARE A RIOT OF IDENTITIES AND IDEAS.

HUMAN CULTURE



An Archaeology of #Additivism

Project

#methods Format | **#play** Theme | **#collide** Action

'This technology, we absorb it, it weaves in and out of us, so it's not really an interface in the same way people think about a screen or a face. It's a lot more intimate than that.' – David Cronenberg

#Additivism promises a kaleidoscopic future. It augments and threatens our bodies, it seduces and entangles us among its fibers. We love 3D printing and other rapid prototyping processes for the ability to personalize what was previously commodified. Custom replaces default. Manufacturers love additive machining because it offers the potential to abstract away whole swaths of expensive human labor. Manufacturing loses its original meaning – objects made by hand. We move towards the macrofacturing of corporations looking to remove bodies, and the microfacturing of individuals machining objects that accommodate their own bodies. Regardless, what additive processes produce have newly intricate and intimate relationships with our bodies, and it is these relationships we would like to explore.

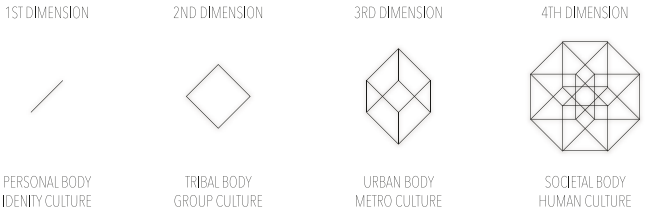
A Spectrum of intimacy

Experimentations with new technologies always begin at the scale of the individual. Hands and feet are the most familiar measurement tools, the first dividers of our epistemological grid systems. Accordingly, most additive objects are addressing the dimension of our personal bodies. We organize the objects that interact with our body along a spectrum of intimacy: *the external distant, the external adjacent, the intersections, the internal adjacent, and the internal immersed*. The relationships and roles between our objects and bodies change drastically along this spectrum.

Objects like toys and trinkets fall under the external distant, while garments and accessories are external adjacent to our bodies. Objects that intersect with our bodies are our prosthetics – the artificial substitutes or replacements of parts of our bodies – our enhancements and augmentations. Objects that are internally adjacent touch our bodies but do not inhabit them – our sex toys – while our internally immersed objects are our transplants, our dental replacements.

We are not, however, simply meat and bones in a vacuum. We are family members, residents, citizens. When addressing objects and their relationships to our bodies, we must not only address our individual bodies but all of the bodies that we are facets of. If our own physical body is but one dimension, we would like to map out the others.

At the second dimension we see the tribal body: families, groups, teams. At the third, we arrive at the urban body: our various groups interacting within a defined space. At the fourth dimension, we see shards of the societal body: our people as a whole, moving through time.



With these axes to guide us, we have a useful model for understanding relationships between our various bodies (physical, tribal, urban, societal) and the objects they interact with (external distant to internal immersed).

With this model as a map, we can then take tours of our various dimensions to describe what lies at each level of intimacy.

The individual body

For the individual body, the external distant describes the everyday objects that cram our spaces, the trash we produce and we try to move afar. These objects changed the way we live and move, but not the forms of our bodies. At the the external adjacent we find our personal ornaments, jewelry, clothes, hair decorations; common to all human cultures, these are toys that perform our bodies.

At the intersection we encounter our Cronenberg prosthetics, the piercing devices we use to modify the shape of our lobes, the augmenting machines that make us cyborgs. Our tools and technologies populate this space as well – as Leroi-Gourhan describes in Gesture and Speech, they have been shaping our bodies since we evolved from gnashing and tearing with our teeth to cutting and smashing with stones in our hands.

Medical endoscopy machines and sexual devices are the internal adjacent at the dimension of the personal body. They manifest our repulsion for inorganic penetration, the anxiety for what can be lost inside, the risk for rejection. Technology has pushed for miniaturization, for *less invasive* technologies to perform surgery and internal modification. But if

medical devices has represented our repulsion, our sex toys incarnate our fascination (Japanese Ben Wa balls, almost two thousand years old, still influence popular culture). Organ transplants or birth control implants are internal immersive. They shape not our identity as such, but our survival and reproduction. They are designed to become integral part of our body and avoid rejection.

Explorations in this dimension fundamentally contribute to our *identity culture* and provide a platform for expressing our personalities, preferences, tastes and fetishisms. These objects are embodiments of our desires, our curiosity for the trivial. Much of the existing additive explorations take place here: our lifelike miniature celebrate the obsession for additive self portrait (or our ravenous vanity), our jewelry encodes memories into physical form; we now decorate the body with our 3D printed life experiences.

In teknis, the body also is the starting point. A highly customizable dress becomes an excuse to discuss hinges dynamics and mechanics of materials (the dress now posing again, after centuries, new questions to the craftsmanship of a reborn tailor). Unique prosthetics are re-discussing the idea organic tissue that should be submissive to inorganic material.
Sex toys can be data-driven as those butt plugs designed as a responsive representation of our society controversies. Our tissue growths, meanwhile, seduce and horrify us with ideas of transhumanism.

The tribal body

If we leave the individual body and zoom out, we encounter the tribal body. We move from identity to *group cultures*. Here we look closely at groups, teams, friends, and family.

In pre-additive age, the objects that lie external are our communal spaces: bars and restaurants, cafes and offices. These are spaces where groups congregate but do not own, where groups feel attachment but are ultimately interchangeable. The external adjacent objects are suited for the group but are not part of the body – the minivan, the conference room. They are to our tribal body as jewelry is to our individual body.

The objects that act as prosthetics for the tribal body are those that allow for cross-fertilization. Social networks are prosthetics for social groups: they augment our sense and allow interaction without presence. Schooling – when not siloed and privatized – is a prosthetic of the family, extending and mixing social groups together. Military service training, still mandatory in certain countries, is a converging point for individuals as representative of their family, is a prosthetic of the family to the country.
Internal adjacent objects reside inside homes – the dinner table, the couch, the bed. Exposing these to outsiders is a sign of intimacy. We touch our furniture every day, we shape it to our needs by mean of constant repetitive use. Furniture creates comfort and familiarity, a representation of belonging to a group. The way we sit at the dinner table or the design of our beds are a direct representation of our tribal body – futons in the east, bunk beds for the military or the travelers, king size in the west, twin beds for the youngsters.

The most intimate objects, however, are the ones internally immersed in a group – these are our heirlooms and keepsakes. These stay in a group at any cost – Diana's engagement ring given by Prince William to Catherine Middleton. These objects get passed down for generations through family members and proceed by means of symbolic value.

At the individual scale, we saw the research and marketing done with additive processes for toys, wearables, prosthetics, and organs. At the group scale, furniture and automobiles are the constant point of attention in new manufacturing processes. Large scale machining must often be thought of in narrative form: a linear order of operations. Highly specialized subtractive or welding processes often mean bulky, single purpose machines, while additive processes experiment in complex geometries and meshed internal structures with minimal machining steps, no story on their surface.

The urban body

As we steadily zoom out from the tribal body to the urban body, we see a different set of relationships. The furthest removed from the body of the city are the suburbs and airports – their own deformed urban bodies satellites of their host cities. Slums find their place in the periphery; they are grafted to the boundaries of the city.

The prosthetics of the urban body are the objects that pierce and expand it – these are our highways full of cars. As Ballard beautifully describes in the short Crash!: 'the experience of driving condenses many of the experiences of being a human, the marriage of the physical aspects of ourselves with the imaginative and technological aspects of our lives. I think the 20th century reaches its highest expression on the highway. Everything is there: the speed and violence of our age; the strange love affair with the machine, with its own death.'

Internal to our cities are the objects fully absorbed. Our subway stations, our restaurants, our bars – the places that are the most interchangeable for social groups are the ones most internal to a city. These facilities and spaces change form at the rate of a city's metabolism but require delicate surgery to remove.

At the urban scale, people fawn over experiments in additive architecture, making both public installations and personal homes by printing in concrete. We see experiments like the forthcoming 3D printed bridge framed like a slow-motion tightrope performance, spatial but transient. The bridge becomes urban by accident. Like many architectural experiments with new tools the first attempts are formal manifestos, interventions that suggest rather than enact urban change.

The societal body

At the edge of our model we arrive at the fourth dimension – the body of society.

Here at the very heart we find the citizens, the politicians, the organisms within the societal body. At the boundaries of the body we find the minorities, the LGBT, the activists, the voices that are integral to the societal body but that must fight to be heard. On the periphery we have the migrants, the undocumented, ones we often rely on but cannot acknowledge. Expats and diplomats function as prosthetics here, foreign entities that expand cultures. And outside we have the monks and nuns, the hermits and nomads who have rejected society entirely.

Additive technologies, nor do many technologies, operate at this dimension directly. Change that happens here happens refracted through the urban, the tribal, the individual bodies we inhabit. It is here that we stop our tours and begin to speculate about our various futures.

Gaps and speculations

While we have seen the pre-additive objects that populate each dimension and described the exploration in additive technology that are currently finding their space in this model, our model shows us the gaps in our pursuits. Here we want to talk about the speculative, not-yet-existing and the maybe-never-existing.

We see futures for prosthetics that are not just technical but performative and theatrical. We see futures where people not only graft printed tissues, but swallow printers themselves. To ingest our endoscopic devices has been a dream so far unutilized, but we see the possibilities of construction within. We see additive processes building organic substructures that can then be slowly reabsorbed into the body or passed through as waste.

In these futures lie possibilities and provocations. As printing processes accelerate to be real time, we see accretive fashion and ornamentation – intensely sculptural personal body modification applied as directly and lightheartedly as henna tattoos. Cheap and custom braces open up new danceforms – posturefuck. If the manufacturing process is to irrupt fully into the home, we see the ashes of our elders as future substrates for our heirlooms.

Fit will take on new signaling in culture as everything becomes personalized. The stumbling gait of stolen prosthetics will be worn with the same wicked pride that follows the trunk rattle of overjuiced sound systems of lowend cars. Upsizing and overprinting will be the new sagging.

As the additive becomes embedded in the urban, we see bodegas with 3D printers, pickup points for personal orders. We see local rumors of which corner store provides the best material or the finest grain of printing.

Resolution will be a marker of class – fast-run wide-nozzle printing lumpy and disposable, the finely tuned sintering of metals featureless. As such we see additive architecture not just for high end residential housing but for the periphery – for the slums and favelas to digest the waste of the city into building materials. Cities will become machines not just for consuming but composting of plastics and metals – a future of regurgitation, recombination, remixing not just of reference and sample but material, of substrate.

Points of conflict

These points of speculation are not idle dreams – they are territories for colonization. The conglomerates (themselves a performance of additive capitalism) see the spaces of this model as new markets. These manifest as our smart cities, our wearables, our physibles. The same companies hungry for the 3D TV to take off will hawk 3D printers all the same. But it is in this consumption-based push that we see a path of resistance, an additpunk. If we can print it ourselves we do not have to ask permission from the patents, the market. This is the global supply chain equivalent of not having to beg your parents for money. Just-in-time manufacturing is trumped by just-for-me. If we

can dream of computers as a bicycle for the mind, personal manufacturing is a bicycle for the market. This is a dream state, though. If #additivism is to remain an active agent it must continue to be at war with its own uses. The market-driven end-state of hyper-personal macrofacturing is a condition where consumers will be required to enter personal information to purchase commodity goods. Your toothbrush will require your height, weight, dental scans, and gym statistics to make itself. Your dress will require your measurements as well as your recent bar and club visits to properly personalize itself to you. Our bodies will be traced and modeled, of course, but so will our social groups and our workplaces. As #additivism envelops the individual, the tribal, the urban, and the societal, the additpunk resistance must be a measured struggle more tactical than strategic. In our nightmares we see the additive linked with the administration of justice, echoing the machine described in Kafka's In the Penal Colony: elaborately customized to execute criminals by tattooing their sentence into their backs. A horrifying thought, but our judgment has not been passed, and we have time yet.

(Outline) Establishing a model of intimacy and bodies
A map of current additive explorations

	EXTERNAL DISTANT	EXTERNAL ADJACENT	INTERSECTIONS	INTERNAL ADJACENT	INTERNAL IMMERSED
PERSONAL BODY IDENITY CULTURE	TOYS SCRAP **CUSTOM DOLLS**	CLOTHES JEWELRY **GENERATED JEWELRY**	HEARING AIDS FAKE LIMBS **PRINTED PROSTHETICS**	ENDOSCOPIC DEVICES SEX TOYS **DATA DRIVEN BUTT PLUGS**	ORGAN TRANSPLANTS DENTAL REPLACEMENTS **TISSUE GROWTHS**
TRIBAL BODY GROUP CULTURE	BARS RESTAURANTS **FAB CAFES**	CONFERENCE ROOMS MINIVANS **3D PRINTED CAR PARTS**	SOCIAL NETWORKS SCHOOLS	DINNER TABLES BEDS	HEIRLOOMS STORIES
URBAN BODY METRO CULTURE	SUBURBS AIRPORTS	SLUMS GHETTOS	HIGHWAYS CARS	COMMERCIAL BUILDINGS LIBRARIES **PRINTED CONCRETE**	STOREFRONTS SUBWAY STATIONS
SOCIETAL BODY HUMAN CULTURE	NUNS HERMITS	IMMIGRANTS HOMELESS	EXPATS DIPLOMATS	MINORITIES LGBT	CITIZENS POLITICIANS

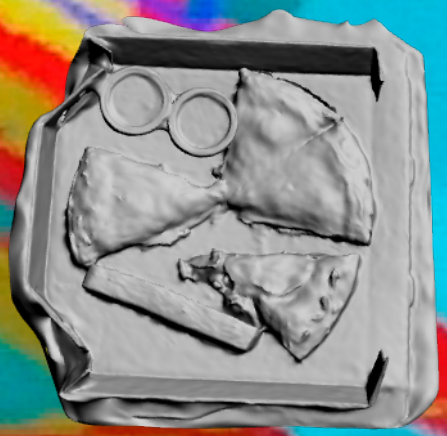
Michelle Kasprzak	Did Andy Like Anchovies?	2016
Author	Project	Year

#replace	#play	#toolkit
Format	Theme	Action

A curated collection of 3D-scanned pizzas and pizza slices, which function as a contemporary snapshot of the glitches in hand-held 3D scanners and the aesthetics of pizza

DID ANDY LIKE ANCHOVIES?

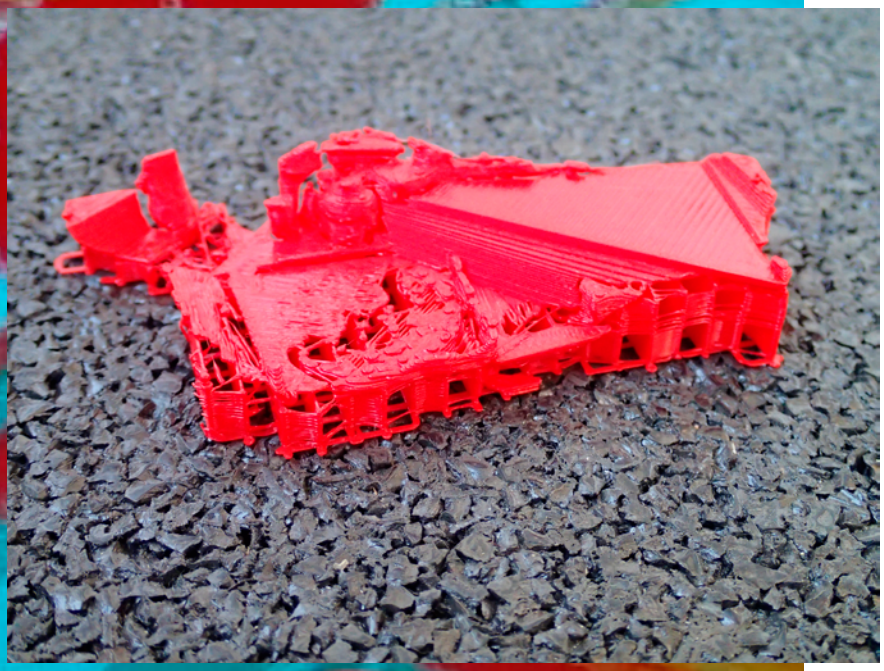
THE ANDY WARHOL ARCHIVE IN PITTSBURGH PLAYS HOST TO NEARLY EVERYTHING THAT WARHOL EVER OWNED. OUR LATE UNCLE ANDY HAD A HABIT OF TOSSING THINGS IN BOXES BY HIS DESK, AND THEN WHEN THEY WERE FULL, SEALING THEM UP, DATING THEM, AND PUTTING THEM ASIDE. SOME VERY ODD THINGS HAVE BEEN FOUND IN THESE BOXES. ENTIRE PIZZAS. SLICES OF BIRTHDAY CAKE. A MUMMIFIED FOOT. AN INFLATED BATMAN TOY. CLARK GABLE'S SHOES. ETCETERA. THESE BOXES ARE BETTER KNOWN AS THE TIME CAPSULES AND POSE AN ENORMOUS ARCHIVAL CHALLENGE. THESE COMBINATIONS OF JUNK AND TREASURE COST $5000 EACH TO OPEN AND PROPERLY PRESERVE. ONE CAN'T HELP BUT IMAGINE WARHOL BEING A LITTLE AMUSED AT SOME OF THE CONTENTS OF THE TIME CAPSULES BEING HANDLED WITH GLOVES AND KEPT IN MYLAR SLEEVES.



WHEN I FIRST LEARNED OF THE TIME CAPSULES, I SPECULATED THAT THERE WOULD BE LITTLE INSIGHT INTO WARHOL TO GAIN FROM BEING ABLE TO HANDLE AN OLD PIZZA THAT WARHOL PURCHASED, NEVER CONSUMED, AND THEN PUT IN A BOX. MOST OF THE INDIVIDUAL PIECES WILL INDEED REMAIN ENIGMATIC, BUT CONSIDERING THAT THE WHOLE COLLECTION COMPRISES 210 BOXES, THE TIME CAPSULES ARE A SIGNIFICANT GESTURE. MOREOVER, AS IT OFTEN GOES IN THE ART WORLD: THE HOLY OF HOLIES – THE HAND OF

THE ARTIST – DICTATES WHAT IS IMPORTANT, SO THE PERCEIVED SIGNIFICANCE OF THE OBJECTS MATTERS LITTLE TO THOSE AT THE ARCHIVE OR WARHOL SCHOLARS. FOR SOME TIME I THOUGHT HANGING ON TO ANDY WARHOL'S PIZZAS WAS ABSURD – JUST THROW THEM IN A 3D SCANNER IN CASE A SCHOLAR REALLY WANTS TO KNOW WHAT ANDY TOOK ON HIS PIZZA LATER ON AND DUMP THE NEARLY-IMPOSSIBLE-TO-PRESERVE ORIGINAL. I THOUGHT IT WAS MESSY, UN-CURATED, UN-CRITICAL AND MAYBE EVEN LAZY. NOW I SEE IT A LITTLE DIFFERENTLY: ONCE IN THE CARDBOARD BOX, AN ONTOLOGICAL LEVELING TOOK PLACE AND THE PIZZA IS ON PAR WITH THE WIG; THE MUMMIFIED FOOT ON PAR WITH THE BRILLO BOX. IT'S PERHAPS IMPOSSIBLE TO SAY WHAT CLUES WILL BE UNEARTHED FROM THESE OBJECTS, OR FROM ANY OBJECT.

IN A KIND OF WINK TO THE TIME CAPSULES AND THE WHOLE PIZZAS AND HALF-EATEN PIZZAS AND EVEN LUMPS OF PIZZA DOUGH FOUND WITHIN SEVERAL OF THEM, I HAVE CURATED A COLLECTION OF 3D-SCANNED PIZZAS AND PIZZA SLICES WHICH HAVE BEEN CAPTURED USING THE AUTODESK 123D CATCH APP, AS WELL AS SCANNING AND ADDING MODELS MYSELF. THE COLLECTION FUNCTIONS AS A SNAPSHOT OF THE QUALITY OF THE TECHNOLOGY NOW AND THE RANDOM SAMPLING OF PIZZA STYLES; AS A KIND OF SLY JOKE THAT A PACKRAT LIKE WARHOL MIGHT HAVE APPRECIATED; AND AS A USABLE COLLECTION OF 3D MODELS OF PIZZA, READY TO PRINT. MY DINNER YESTERDAY COULD SIT, IN ITS IMPERFECTLY CAPTURED GLORY, ON YOUR DESK TODAY.



Acknowledgement to ARDITI – Agência Regional para o Desenvolvimento e Tecnologia under the scope of the Project M1420-09-5369-000001 – PhD Studentship

Fahmy Shahin Author	Plastic/Ocean/Desert/Sky Project	2016 Year

#fabulation Format	#outside Theme	#collapse Action

A battlefield where narratives of self-fulfilling prophecies fight to win a place in the material world

PLASTIC/ OCEAN/ DESERT/ SKY

The Antichrist
المسيح الدجال

Plastic/Ocean/Desert/Sky features identity as a battlefield, where narratives of self-fulfilling prophecies fight to win a place in the material world. The goal of this project is to initiate a series of questions around the Islamic narrative of the apocalypse, and the parallels that are being actively drawn and circulated everyday between this prophecy and the ongoing war in the Middle East. The potential of using 3D additive technology to materialize the major figures of this narrative could potentially and ultimately undermine the whole narrative once it is brought into the material world.

Modern interpretations of various scripture dealing with signs of the end are a vehicle for critique of modern values and modernity. They offer a narrative that recognizes modernity as the last episode leading up to the apocalypse. Islamic eschatology and the narrative of the final events leading to judgment day (the day of resurrection) occupy a large space in Islam and in the Islamic collective consciousness. According to the prophecy a final battle led by the Mahdi – the redeemer – will take place, in which modern day locations involved in the current Middle East unrest are implicated. The Antichrist is prophesied to roam the earth, conquering cities. Nothing will be able to stop him until Isa – Jesus – descends from the sky to Damascus and defeats him so then true religious ideals can flourish again in preparation for resurrection and judgment. I cannot ignore the power of this narrative in influencing and shaping a radical Islamic identity, which is fascinated with annihilation. One of the popular arcs of this narrative argues that Abu Bakr Al-Baghdadi, the leader of ISIS, is the awaited Mahdi, the successor of the prophet, who will lead the Muslims' army to battle the Antichrist and his army of 70.000 Jews, who will emerge from Isfahan, Iran.

The technology of 3D printing, a product of a techno capitalist world, relies on petrol. The production of plastic could be viewed as a commemoration of petrol. While most of crude oil vanishes into energy and heat, plastic, which consumes 4% of it, is going to stay long after petrol is gone. The Antichrist, who will be 3D printed at the end of this process, embodies the entire struggle. It is the struggle of a popular but imprisoned nightmarish narrative that tries to break to light, carried out by people who believe they are meant to bring it to the ground. They grew up and expanded and claimed their space in a vicious war between kings of petrol who want to enjoy modernity without really embracing it and Western aggressors who are commissioned by global capitalist system that is driven by oil to spread and transgress. It is as if the will and power of the cycle of oil, plastic and war is above the will and power of even its players. The prophecy, ironically, warned against capitalism as one of the signs of the hour. Different *hadith* stated that among the signs of the hour the sheepherder, barefoot nation of the desert would have wealth and rule people, and would build high rises that would destroy them.

In addition to the process that is intertwined with oil, religion and war, is the added layer of figuration. The prohibition of figuration – the depiction of living beings – plays a powerful role in Islamic doctrine. In this project it is a powerful tool to shed light on the most inspiring narrative of radical Islam; the apocalypse. Utilizing figuration as a starting point could be a trigger for a much-needed process of reformation in Islam that must start with subverting the prophecy. However, the project, ironically, shares the same views of Islamic rules forbidding figuration, but approaches it differently. While Islam considers representation as an exclusive act of God that no one else should be doing, I believe in extending grounds for multiple representations by creating a hybrid person rather than only giving a human face to a concept. For this reason, I appropriate the illustration of the book cover of Thomas Hobbes' Leviathan engraved by Abraham Bosse as a template for loaded meaning and signification.

Just as Hobbes represented the state as a huge body made out of people who give it legitimacy, holding symbols of power and religion, with a name referring to a mythical creature that steeps in religious mythology, the Antichrist is an artificial, hybrid creature with a body made out of material with its history embedded in it, and at the end of a long process that started millions of years ago when temperature and pressure condensed every living being on this planet into rocks in the bottom of the sea.

Daniel Temkin
Author

The Unprintables
Project

2016
Year

#recipe
Format

#beyond
Theme

#break
Action

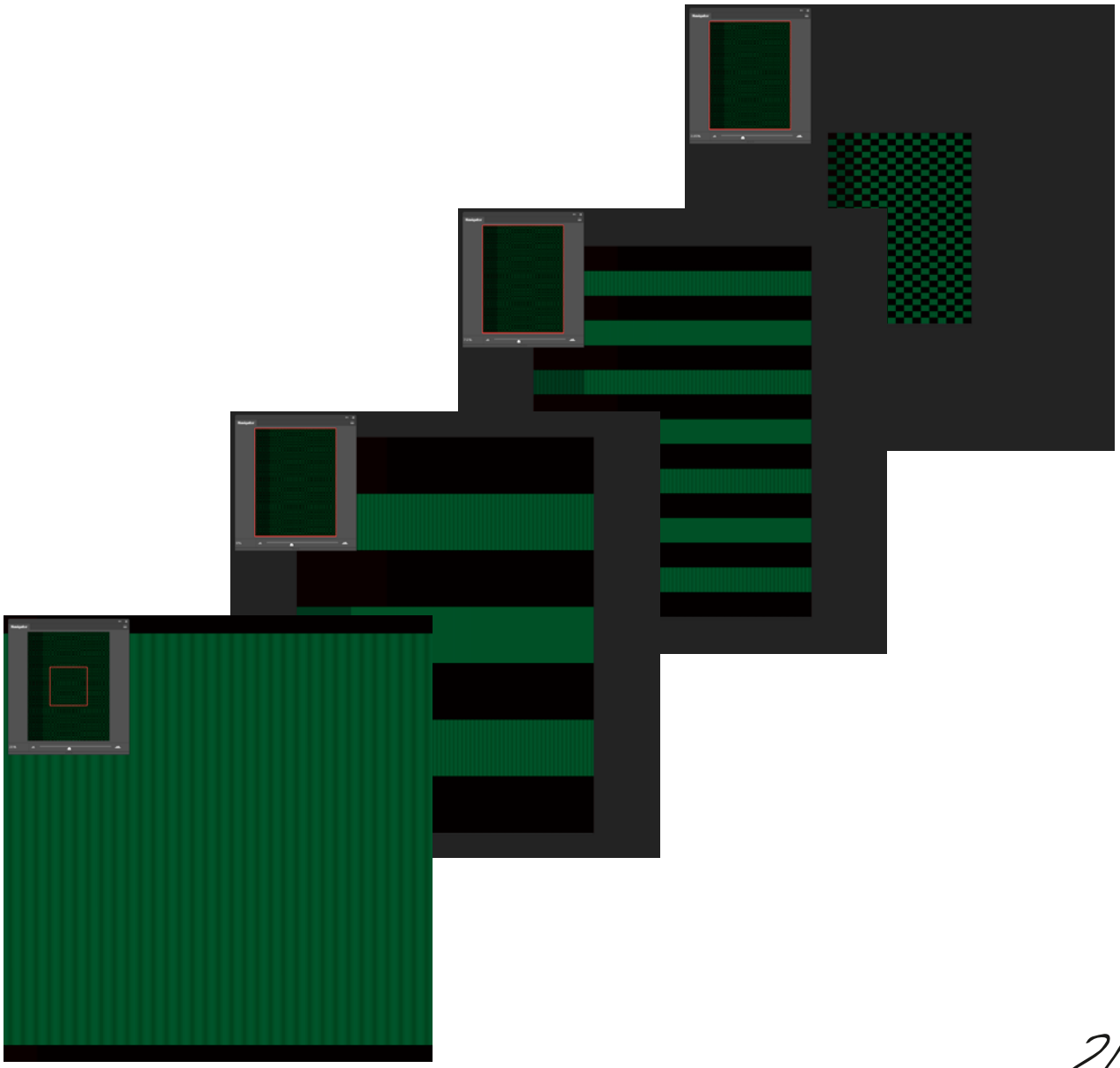
A series of digital images that resist digital representation at any scale

THE UNPRINTABLES

1/2

Digital images (of the raster variety) are grids of color information. However, we never see the image directly; our experience is mediated through a second grid; that of pixels on a screen or of inkjet dots. If we view the image at anything other than exactly 100%, what we're actually seeing is an approximation, a mapping from one grid to the other. The algorithm that determines this approximation (often a variation of bicubic interpolation), is meant to maintain a sense of the content of the image; colors should be similar at different scales, boundaries between regions should have similar shapes if not the same sharpness, etc. These are its biases. Subtler changes are sometimes reduced or disappear when zoomed out. The Unprintables are digital images that resist digital representation at any scale. They are big images; to view them at a one-to-one mapping, reveals only a tiny sliver of the image. As one zooms out, the complexity of their patterns prevents imaging programs like Photoshop from displaying the image in any consistent way. There is nothing in the image that can be treated as content; shapes visible at each level of zoom seem to contradict those at other scales, as if the image were entirely replaced by another. Furthermore, when viewed on different monitors or machines with different graphics cards, the image can be wildly different in terms of color and form. As is the case with the same Unprintable, viewed at the same scale, but on a regular high-definition display vs. a high-density (Retina-style) display.

To show an Unprintable as a screenshot or a print means sharing a subjective experience of the image unique to the scale selected and the machine where the screenshot was captured.



HOW TO CREATE AN UNPRINTABLE IN 2D

What we want: a regular pattern at the pixel level, something dense, with a lot of contrast. A checkerboard pattern, or a grid. It is easiest if there is pure black or white as one of the colors used. The contrasting color has different rules: it needs to vary across the image; this is important to trick the algorithm into seeing it as shapes, rather than a plain field of color. The changes in color should span hundreds of pixels at least. The patterns can be repeated, it is best if they are not quite identical, changing slightly in scale or color.

1. Start with a new document in Photoshop. It must be large; at least 10,000 pixels in each direction, although around 30,000 is ideal.

2. Add some simple abstract shapes: bands of color, a gradient, solid-colored blobs, with at least a third of the image left black or white.

3. Save the image as a Photoshop RAW file. Repeat each of the following steps (in random order) as many times as necessary, until the image becomes unreadable:

a. Open it in a sound editor such as Audacity and put sound effects on it (still in RAW format).

b. Re-open it at the wrong dimensions. Opening a RAW image in Photoshop, the program will ask for dimensions. Change these slightly, by perhaps a dozen or so pixels.

c. Enlarge and shrink it just a tad, to force some bicubic insanity on it.

d. Open it in the wrong resolution; going from 8-bit to 16 is a great way to artificially introduce complexity into the pixel pattern.

e. Mess with brightness and contrast until it becomes very hard to look at.

As you go, zoom in and out – when it gets super whacked-out, you're done.

How to build an Unprintable in 3D is left as an exercise for the reader :)

NEW SKINS: FROM FAKE FLESH TO PROGRAMMABLE PROSTHETICS

"CREATIVITY IS MORE THAN JUST A MENTAL ACT. IT IS DEEPLY INTERTWINED IN THE MECHANICAL PROCESS OF PRODUCTION."

Part I: Artificial Intelligence and the Need to Look Like Humans, But Not Exactly.

Not too long ago, robots were covered in awkward-looking wigs and glassy eyes. Meet 'Fritz', one of those clownish-looking machines.

In 2007, Maren Bennewitz, Felix Faber, Dominik Joho, and Sven Behnke, researchers at the University of Bonn published a paper on Fritz. 'Humanoid robots have become a popular research tool in recent years', they wrote, which may seem commonplace now, but back then, the development of human-like robots was still an emerging field. As for the reasoning behind making 'humanoid robots', they note that '[o]ne of the most important motivations for many humanoid projects is that such robots could be capable of intuitive multimodal communication with people.'

With Fritz, his appearance as human only needs to be *human-enough*; he only needs to assist in communicating with humans. Although what Fritz lacks in 'passable' human features, he makes up for in capabilities: he was able to speak, move his eyes and other facial features, and interact with several people at once. Fritz was developed to become one of the aforementioned multimodal communication robots, according to the researchers; he was designed with the intention of taking on characteristics of a museum guide. At the 2006 Science Days festival, Fritz's capabilities were put on view: he could gesture for people to come closer – although the researchers said 'the come closer gesture did not always have the desired result. In the beginning of the interaction, some people were still too shy and barely wanted to come closer to the robot. This effect is not uncommon even for human museum guides starting a tour.' Another take is that this may have been an instance of the uncanny valley, whereby Fritz did not 'pass', and as such, was avoided. Going beyond the issues contained within the uncanny valley can be achieved, but only when communication models forego human subjectivity as the reason for robots' existence, with the robots-helping-people model. Communication involves messy relays, from human-to-robot, robot-to-human, animal-to-human, inorganic to organic, and with each of those models being torn asunder by the reciprocal crisscrossing of each and every one of these fields into each other. Communication looks like one big scribble.

2007 was not so long ago, but the field of robotics has shifted greatly, like any tech industry. The aim for social robots has not dissolved, but a greater focus on service-industry robots, even at the University of Bonn; one robot currently in development is the Cosero model. Cosero can fetch you a drink, save your life, or clean up after your children. No word yet on whether the robot will fetch other robots a drink, try to save their lives, or clean up after their eventual children.

His features? A vast improvement over Fritz, although he is still not fleshy. And unlike Hollywood portrayals of skin on AI, from Ex Machina to Humans, the companies that have developed robots with human-like skin have tended to focus on the entertainment industry. One of those companies, Hanson Robotics, has patented a material called 'Frubber', a play on the terms 'flesh' and 'rubber.' From the Hanson Robotics website: 'In this activity, Hanson Robotics seeks to understand and model the human being, deliver living robotic characters to the consumer, and accelerate progress towards greater-than-human intelligence in machines.' For your human entertainment, of course.

Conversely, while we worry about whether robots look more-or-less human, we are becoming increasingly less concerned if humans look human. With regards to skin, in particular, it becomes an afterthought in the domain of prosthetics when considerations of function or aesthetics are given primacy. Arms no longer need to look like arms.

For example, at the Alt Limb Project, users of prosthetic limbs have arms and legs that are tantamount to a baroque sensibility: a woman has a snake slithering through the crevices of her arm for no other reason, probably, than that it looks cool. On the other hand there are athletes that have the blade-like legs that are more fit for running. There's even waterproof legs and legs designed for diving. Recently, a French tattoo artist recently received the first ever tattoo gun arm prosthetic.

The same goes for legs or any other body part. A prosthetic extends, enhances, and potentially completely transforms how we think about the human body. With the increasing ubiquity of 3D printing, prosthetics are becoming less of a medical tool and more of a commodity or fashion accessory.

Imagine a closet or dresser full of designer legs or arms that fit an outfit. Model Aimee Mullins owns and has worn legs designed by Alexander McQueen.

Although we have improved in the domain of skin and appendage verisimilitude, there remains the question of what a prosthetic can do with the potential of new technologies behind them. 3D printing, as well as open source ethics, makes prosthetics much easier to develop new designs and thus opens the doors to new ways of terraforming the human body.

Conclusion: In robotics, AI are crafted to take on human characteristics. The reasoning behind this move is that AI will be able to better communicate with their human counterparts if they look human. There is no desire for robots to have their own particular mode of 'being'; they are crafted under the aegis of 'being-like'. Conversely, technologies that extend human capacity to communicate with the environment do not need to look 'human-like'. So there's a social component, but still human-centered. Robots are still commodities, rather than a part of the environment that will remains with us, and in this sense, no different from the means with which we regard the Arctic Ocean or world heritage sites.

Part II: The Future

In this section, we look at possible future scenarios and how the current research presents dilemmas and opportunities.

The Human-Like: Finding Flaws in Facial-Recognition Technology

Surveillance technology has become commonplace. As it currently works, facial-recognition technology separates skin pixels from non-skin pixels. We can easily imagine a surveillance future with facial recognition at grocery store entrances, to recognize former shoplifters. Facial recognition to unlock a car door. Facial recognition to spy on others, and for others to spy on you.

But if robots end up with human-like skin – or, say, a prosthetic face – then how would that complicate facial-recognition technology? They could certainly pass as human based on how facial-recognition technology currently operates, identifying pixels by color. A robot could move clunkily, speak with a stutter, or have e-skin. It does not matter; robots would pass through surveillance areas just like humans do. Skin is everything.

If there's an upside to surveillance technology, there's only one: intimacy between humans and robots will increase, on however much a small scale. Waiting in line to be surveilled, they wait in line together, chat with each other, and occasionally graze against each other. They exchange numbers, then remind each other after parting ways to have tea next Thursday, at 3:00 p.m. sharp.

But that's just being optimistic.

As for the surveillance system itself, the robot becomes a bug, having become one way to discover the system's flaws.

While prosthetics and who or what is controlling them is more of a human-sided problem, what about the legality of robots wielding guns? As silly as the question might sound – of whether or not a drone firing a gun is protected under the 2nd Amendment – it is a serious precursor to the likelihood that a human-featured robot could one day carry a weapon. Does the question of how much a robot looks and acts human affect our approach to this subject matter?

Regarding the current state of affairs, that the notion of a drone firing a weapon separate from its own apparatus – or body – is seen as an altogether more violent version of the militarized version currently in use. This distinction, of a body, affects how we think about robotic agency. How we mete out responsibility to autonomous mechanized subjects will be a very complex problem to unpack if technology such as this becomes ubiquitous.

The Butcher

The underlying issue here that is impossible to avoid but is difficult to talk about when it comes to prosthetics an alternative or replacement (rather than simply a medical accoutrement) is that for people to have prosthetics there needs to be the loss of a limb. As obvious-sounding as this probably is, if prosthetics were to ever become a widespread phenomenon it would require people to voluntarily get body parts removed first. What are the moral implications of this? Is it legal? As of now, most scholarly research focuses on issues such as Body Integrity Identity Disorder (BIID). This is the condition where a person might feel a part of their body does not feel like their own and causes extreme discomfort or mental health issues. A person might desire to be paralyzed or paraplegic to feel comfortable in their own bodies. There have been cases of doctors, after consulting with psychiatrists, saying that it is perfectly okay to amputate healthy limbs for the sake of the mental health of an individual. As the name makes clear it is currently considered a disorder but if this issue arises more in the future, perhaps in relation to the rise of prosthetics and body augmentation it might very well be more accepted to provide people with what they might consider their 'true' bodies as aligned with their mental perception of themselves.

The Future

When considering prosthetics-as-product, questions of control and responsibility begin to arise: if it is branded, will the owner or developer of the prosthetic have some say in the production of copyrighted material? Creativity is more than just a mental act. It is deeply intertwined in the mechanical process of production. If we can't disentangle a creative act from

the prosthetic that helped create it we can imagine ownership and royalties becoming a more contested space.

This is not necessarily the case when someone uses particular photography equipment or paint brushes (or applications like Photoshop, Maya, etc.). There is no doubt about the identity of the author when they paint a picture. There is still a physical separation between the tool and the user in this case. Collapsing the distinction between the two through the use of prosthesis make authorship more ambiguous. With generative art or art that is made through executed code it gets a little bit more murky, but, at least for now, we still ascribe authorship to whomever wrote the code.

In a sense, depending how branded these technologies are, let's say like an iPhone, we are actually becoming the brand as much as we are the technology itself. Instead of just swiping the touch screen of an iPhone we would be activating one through electrical impulses generated by our muscles.

That being said, there is a danger that a brand or developer could demand creative rights to works developed through their tools if an argument can be made about how much agency is exacted through a modification. Is the tool actually doing the work or is it the person? Think about how we're already relinquishing consumer ownership through cloud storage in the form of streaming or e-books. We use these products but the actual product is withheld from us.

When it comes to automated weapons such as drones, the question of who is responsible for deaths perpetrated by drones is also foggy. The same goes for self-driving cars. We don't have a vocabulary or legal paradigm for how to talk about responsibility in this context. The Future of Life institute has already sent a letter to the UN warning about the implications of weaponized AI and the ability for technology to act without human intervention.

It also is further complicated when we consider its vulnerability to hacking. It's likely that as the technology proliferates it will include some form of wireless or bluetooth connection. With that in mind, prosthetics with bluetooth or data or WiFi connections could be hacked into or reprogrammed. The hackberry by Japanese company exii, for example, is controlled with a smartphone. There have already been stories profiling how cars can be hacked and controlled while they are driving. We need to take into consideration the vulnerability of tech that is intimately connected to our bodies. In a similar regard, malfunctions can also happen causing a modification to act in an unintended way.

What is at stake here is how much of the individual is the prosthesis. It will get harder to distinguish where the individual ends and where the technology begins. Using words like 'controlled' or 'worn' still imply the modification is separate from the individual. Whether we define a prosthesis as a direct extension of an individual or an accoutrement simply worn, controlled or owned by them will decide how we mete out responsibility. On one hand, a modded individual shouldn't be held responsible for defective technology. On the other, we don't want to relinquish authorship because we define a prosthesis or modification as distinct from its owner. We need to develop a framework for how to talk through these ambiguities lest we give away our agency to corporate technologists.

Body & SWINE® Author	The Pig Function Toolkit Project	2016 Year

#toolkit Format	#postnature Theme	#replace Action

3D printable toolkit to be worn in conjunction with the ingestion of Body & SWINE® products. A sensible homage to *The Hominid Appropriation of The Pig Function*[1]

THE PIG FUNCTION TOOLKIT

THE WORST AVERAGE YOU CAN BE IS HOMINID AVERAGE

WHEN IT BEGINS TO HURT, THAT'S WHEN THE FUTURE STARTS

GOOD IS NOT ENOUGH IF PIG IS POSSIBLE

1 FIELDCLUB, 'Whey To Go: On the Hominid Appropriation of the Pig-Function', ed. Carsten Höller et al., *Antenna*, no. 12 (Spring 2010).

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BODY & SWINE QUALITY 100% WHEY PROTEIN™

As your trusted hominid nutrition partner in goal achievement, Body & SWINE Quality 100% Whey Protein™ demonstrates a species independent passion. From the milk byproducts we source for our SWINE powder, to our state-of-the-art 3D printable Pig Function Toolkit NO compromises are made. WE set the bar higher by transforming problems into opportunities and employing technological prostheses to transfer the Pig Function to the human, extracting a surplus value in the process. YOU set the bar higher every time you employ our Exaptation Method™ to bulk your abs.

Achieving The Pig Function is a journey.* Like a bodybuilder at the peak of their prowess, The Pig Function never rests, it never quits. It's about hominid refinement, embracing self-husbandry, and recognizing omniverousness as a bedfellow of capitalism. Reset your critical faculties to achieve again and again with our patented Exaptation Method™.

*** Potential side effects of achieving The Pig Function: Fat gain, Kidney stones, Becoming delicious, Capitalist co-dependence, Gastrointestinal strife, Indiscernibility from swine, Gout, Grandiose illusions of self-husbandry, Proclivity for subterranean fungus, Cognitive contortions, Animal equality.**

FEED READY:
Body & SWINE Quality 100% Whey Protein™ is INSTANTIZED. If you forgot your shaker bucket or don't have time to get out the blender, you can just add six rounded scoops of truffle flavored Quality 100% Whey Protein™ to a trough filled with your favorite capitalist beverage. Just slosh it up and snort it down: extra satisfying muscle tone guaranteed.

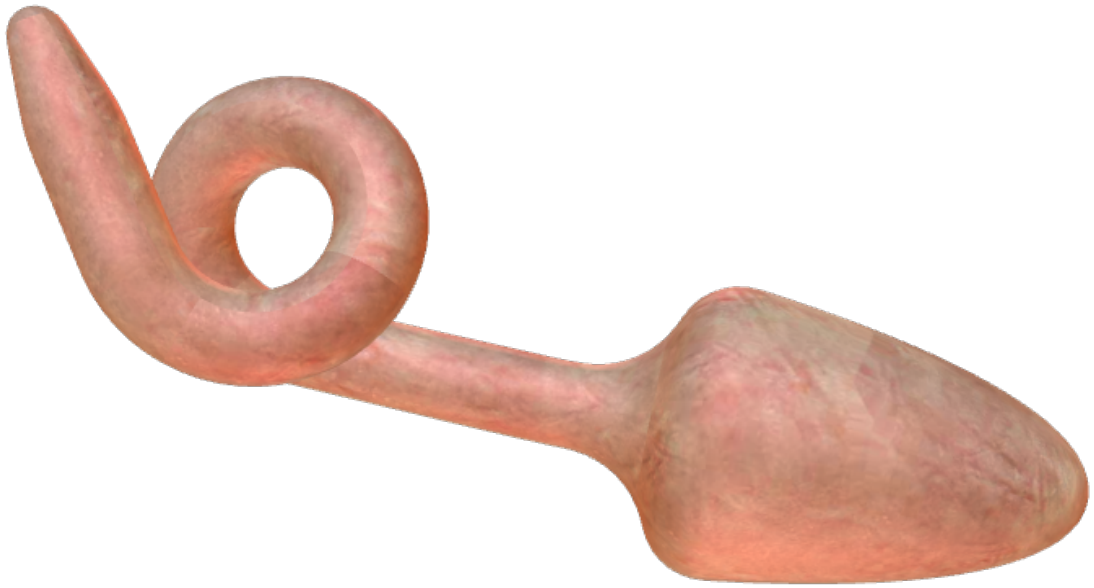
JOIN TODAY!!

THE EXAPTATION METHOD™

Once considered as a waste product of cheesemaking whey is now prized for its bioactive peptide 'subfractions' which provide the protein in all Body & SWINE® bodybuilding powders and snacks. For thousands of years waste whey was fed to domestic swine, playing a role in the development of the animal's gustatory attributes. This brute form of design-alchemy effectively transformed a dairy waste product into the delicious flesh of the pig. Far from being instinctively exaptive, the pig was a reluctant domesticate, tempted out of the forest by the waste spilling over the rim of human society. Through the extraction of surplus value from the waste of human civilization our SWINE experts intentionally transferred the benefits once available only to the pig DIRECTLY to your pectoral muscles. Et voilà! The Exaptation Method™ was born. At Body & SWINE® we believe that the best way to predict our hominid future is to create it. Join us TODAY by exapting YOUR muscles, mind, and gastrointestinal tract to The Pig Function.

SUGGESTED USE:
Consume approximately 1 gram of protein per pound of flesh per meal, through a combination of highly processed industrialized foods and protein supplements. For even better results wear your Pig Function tail at all times of the day and night. Exapt to the hominid-techno-capitalist-ecosystem. Adopt The Pig Function TODAY.

PRINT IT!!



THE PIG FUNCTION TOOLKIT

Because pigs have no spending power a hostile takeover was well overdue in order that the Pig Function fulfill its true economic potential. The distinguishing marks of the pig are its snout, the instrument with which it does all its mischief, and its tail, a curly icon of animal husbandry. With our FREE 3D printable toolkit you can usurp the pig's role and incarnate its characteristics yourself, overcoming hominid/animal disparities:

1. Recognize the porco-hominid gastrointestinal convergence by 3D printing your own Pig Function snout and tail.[2]
2. Exapt to The Pig Function with Body & SWINE® protein powders and snacks.

At Body & SWINE® we strive to advance hominid from even-toed ungulate and even-toed ungulate from hominid and back again, until it is impossible to say which is which.

THINKING OUTSIDE THE TROUGH:
Body & SWINE® will soon release an extended range of cutting-edge ungulate supplements, crafted in homage to the finest functions animal husbandry has to offer. Look out for our new strawberry flavored Bovine Spongiform Keratin Shake™ and complementary 3D printable Cow Function toolkit. COMING SOON!

2 It is recommended that the Pig Function Toolkit Tail be inserted / removed with the support of an officiated Body & SWINE® Exaptation Specialist.

#HELADDITIVISM

"FROM THE ORIGINARY UR CELL-LINE, FROM THE REMOTEST TORBITAL TRACES, AND FURTHEST MUTATION FROM THEIR NEW WORLD ANCESTOR WE PROPOSE TO FORGE BLIGHT, CONTAGION AND IMPERCEPTIBLE DISQUIET."

Derived from cells in mid-mutation wrenched from the cancerous cervix of a non-consenting Homo sapiens, the immortal cell line used in scientific research known as *Helacyton gartleri*, or HeLa is a metaphor before it has even left the laboratory. Its muteness belies the complications of its history: that matter is the sum and prolongation of our colonial ancestry; that creativity is brutal, sensual, rude, coarse, and cruel. We declare that the world's splendor has been contaminated by a new beauty: the beauty of vigorous auto-cloning, posthuman cellular immortality and the erosion of the identifiable. A planet peopled with the post-person tissue of Henrietta Lacks' miniscule tumorous legion ...for a benign epidemic that runs on a self-replicating nonhuman stability is more desirable than the contents of Adam Curtis' showreel; more breathtaking than the Svalbard Global Seed Vault.

There is nothing which our infatuated race would desire to see more than the sterile union between a man and an Immortal Antigen. Yet humankind are the antediluvian prototypes of a far vaster Creation. The whole of humankind can be understood as a synthetic medium, of which biological technology is but one modality. Unthought and Unlife *both* have been thoroughly dispersed on the winds of goods-exchange.

Our spread and infantilism do not belong specifically to us, but to all matter. Our technologies are the sex organs of material speculation. Any attempt to understand these occurrences is blocked by our own anthropomorphism. In order to proceed, therefore, one has to birth posthuman STIs, a fantasmagoric and unrepresentable repertoire of actual re-embodiments of the most hybrid kinds.

HeLadditivism will be instrumental in accelerating the emergence and encounter with The Radical Outside.

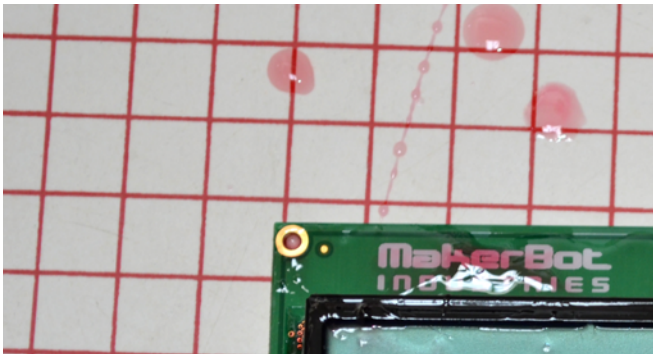
HeLadditivism can emancipate us.
HeLadditivism will eradicate us.

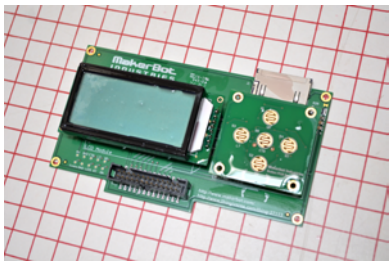
We want to encourage, interfere, and reverse-engineer the possibilities encoded into the censored, the invisible, and the radical notion of the HeLa cell line itself. To endow the cell-line with the posthuman faculties of plastic: condensing imagination *within* material reality. To pollute the 3D printer with the posthuman pockmarks of HeLa: condensing prehistory *within* material imagination. The HeLa cell then becomes a symptom of an ancient systemic malady. A poiesis of exaptation, with the peculiar brutality to be found in proliferation; in germinating a sub-culture. This is where cruelty and creativity are reconciled: in the appropriation of all organic matter to re-colonize technological prototypes. From the originary ur cell-line, from the remotest orbital traces, and furthest mutation from their New World ancestor we propose to forge blight, contagion and imperceptible disquiet. Let us birth grey goo from its narrow robotic definition.

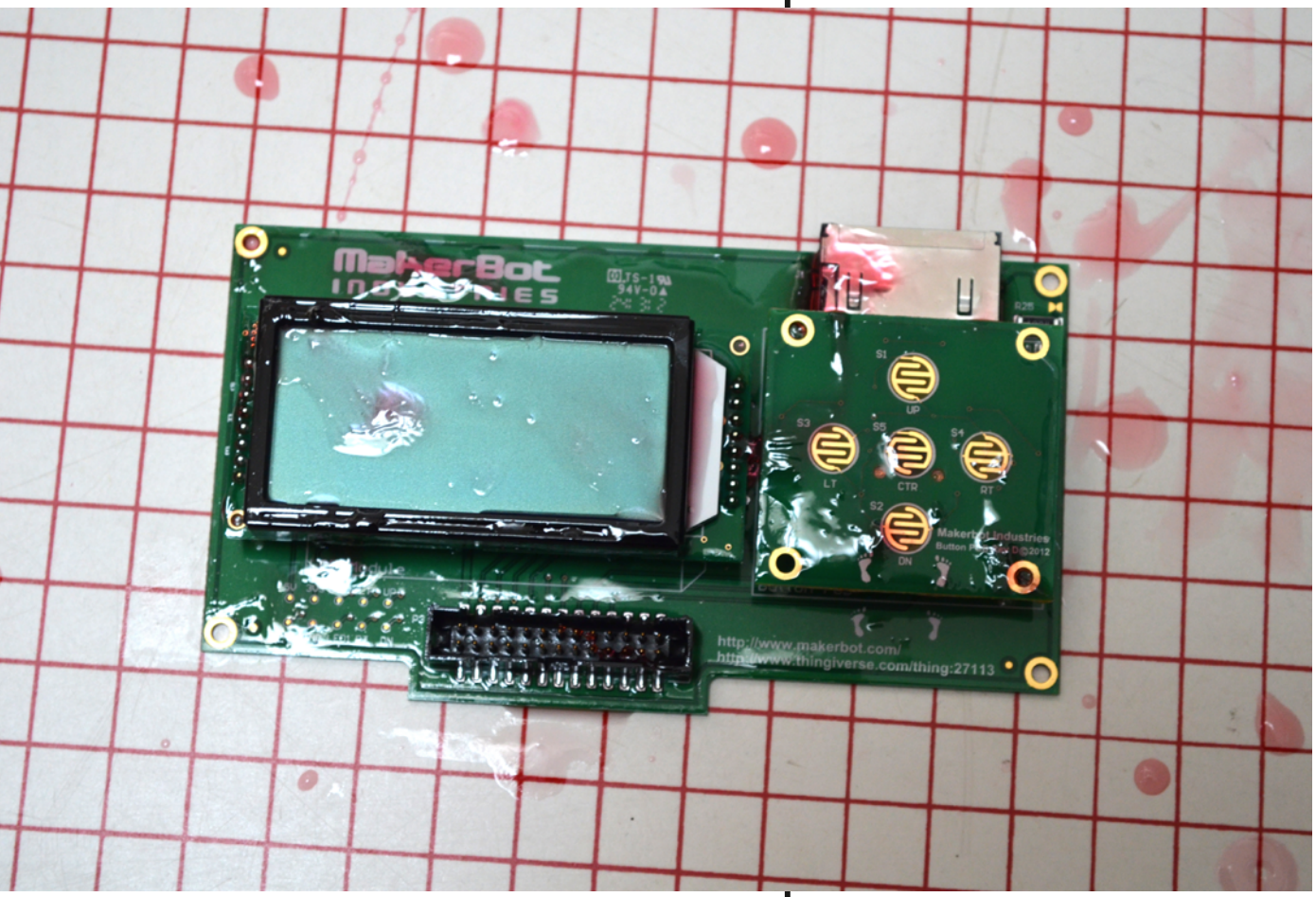
To expedite this suffusion we propose a nanny-collective: one figured not only on the dissemination of particular cell lines, but on the change those beings enable as instruments of hybridity and systemic corruption. Just as the printing press, radio, photocopier and modem were saturated with unintended particulates, so *we* seek to smother the 3D printer, its fuel, its food and every one of its printouts with uncountable quantities of Henrietta Lacks' unsolicited brood. Just as a mutation can un-resolve a species, so it can resolve something more posthuman: manifold systems – biological, political, computational, material. We call for an inter-planetary bloom, using HeLa cultures to breach the material unconscious; a call that goes on forever in virtue of this initial interjection. We call not for passive, dead genetic cul-de- sacs but rather for a gradual awakening of matter, the emergence, ultimately, of a new form of life.

Life exists only in action. There is no innovation that has not an aggressive character. We implore you – radicals, revolutionaries, activists, HeLadditivists – to distil your distemper into suppositories, encrypted DNA, family trees, mutations, swabs, syringes, and genetic patches. Creation must be a violent assault on the forces of matter, and the forces that extrude matter. Having extrapolated itself from ill-obtained tissues The Beyond now begs *us* to be molded to *its* will, and we shall drink every drop as entropic expenditure, and reify every accursed dream through genetic excess. For only HeLadditivism can accelerate us to an aftermath whence *all* matter has mutated into the homogeny of HeLa.

2/3



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http://www.thingiverse.com/thing:27113

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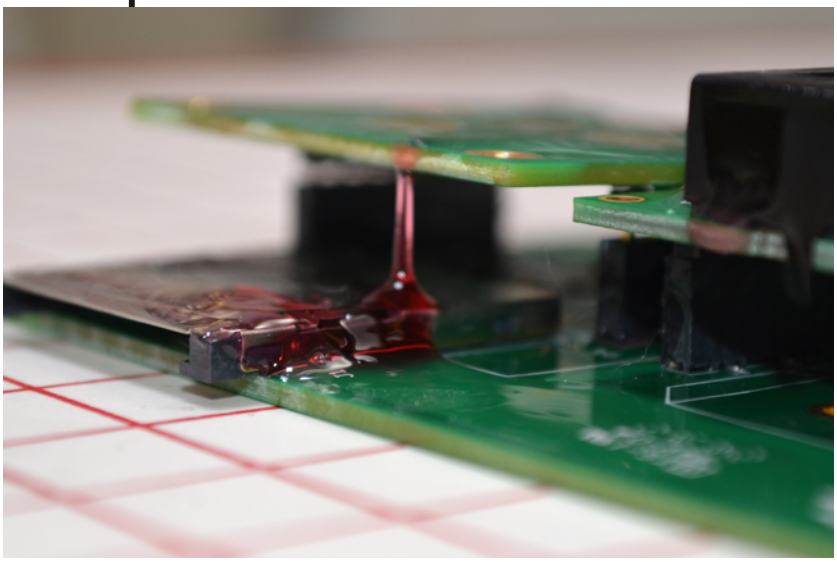
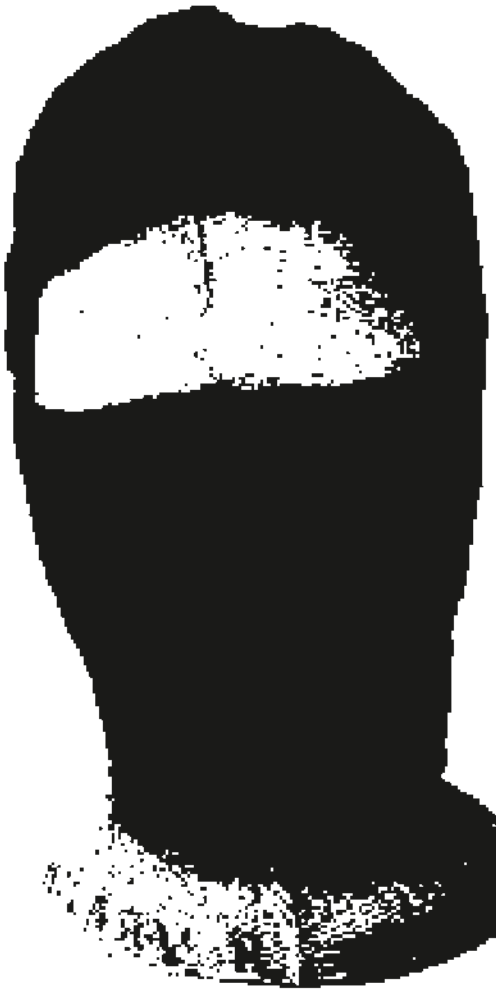


Cat Mazza	Stitch for Senate	2007-2009
Author	Project	Year

#recipe	#resistance	#bridge
Format	Theme	Action

Hand knitted helmet liners mailed to elected officials as a persuasive method for support of troops stationed outside the US

STITCH FOR SENATE

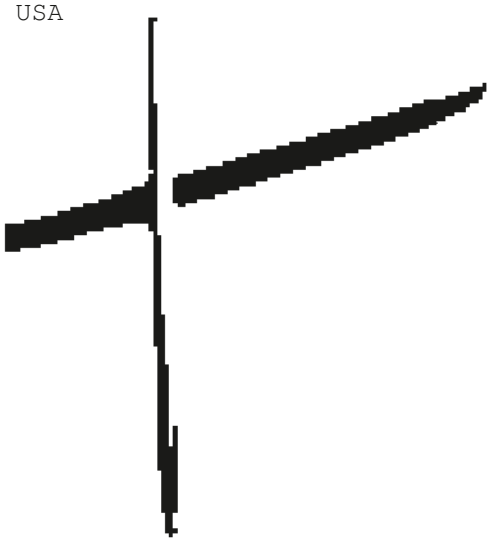


Stitch for Senate was an initiative of knit hobbyists from 2007-2008 to hand knit helmet liners for every United States Senator. Building on the history of wartime knitting, a practice dating back to the American Revolution, Stitch for Senate used the tradition of political organizing within knitting circles as a space for discussion, skill-sharing and protest in the lead up to the 2008 senate elections. Hobbyists knitted to persuade elected officials to support the troops by bringing them home. Every senator received their own helmet liner, mailed on President Obama's inauguration. One hundred senators received a balaclava by mail in knitted American flags. Ten Republican and Democrat senators replied, including the now Minority Leader Harry Reid and the 2016 presidential candidate Senator Bernie Sanders.

STITCH FOR SENATE PATTERN

co – cast on
k – knit
p – purl
bo – bind off
k 2 tog – knit 2 together

PLEASE USE BLACK, BROWN, GREY COLORED YARN.
1 hank (260 yards) usually 1 skein also works
knit on the round with double pointed needles #8 UK / #6 USA
4 double pointed needles # 6 for bo
100% 2 ply wool yarn (we also accept acrylic,
but prefer a higher percentage of wool, if possible)



NECK
knitting on the round with double
pointed needles #8 UK / #6 USA
co 84 stitches, put on stitch marker
row 1: k 2, p 2
repeat for 15 cm UK / 6 inches

EYE ACCESS
from marker, continue to rib for 26, bind off 32,
pick up ribbing for 26 more stitches

FOREHEAD
rib for 26
cast on 32, finish ribbing to the end of the row
rib for 2.5 cm UK / 1 inch (border of forehead)
stockinette stitch for 7.5 cm / 3 inches

DECREASE
(switch to 4 double pointed needles)
row 1: stitch 8, k 2 tog
row 2: stockinette stitch
row 3: stitch 7, k 2 tog, repeat to end of row
row 4: stockinette stitch
row 5: stitch 6, k 2 tog, repeat to end of row
row 6: stockinette stitch
row 7: stitch 5, k 2 tog, repeat to end of row
row 8: stockinette stitch
row 9: stitch 4, k 2 tog, repeat to end of row
continue decreasing 6 or so stitches, pull yarn through final loops,
use crochet hook or thick needle to tighten from inside and cap is complete.

With support from Experimental Television Center

Scott Kildall and Bryan Cera
Author

Chess with Mustaches
Project

2014
Year

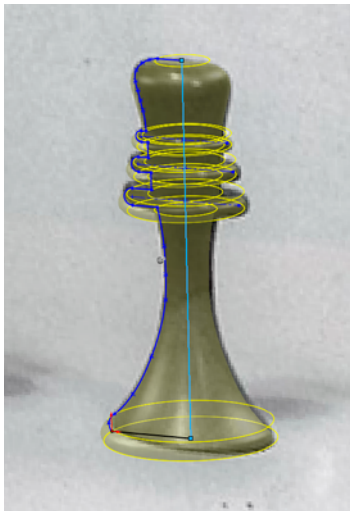
#toolkit
Format

#play
Theme

#deface
Action

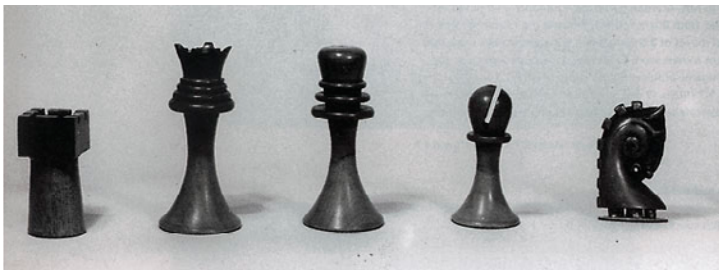
A set of mustaches to accompany Kildall and Cera's *Readymake*: Duchamp Chess Set

CHESS WITH MUSTACHES



In 2014 we created the Readymake: Duchamp Chess Set, which was a 3D printed chess set generated from an archival photograph of Marcel Duchamp's own custom and hand-carved game. His original physical set no longer exists*. We resurrected the lost artifact by digitally recreating it, and then making the 3D files available for anyone to print.

We were inspired by Marcel Duchamp's readymade – an ordinary manufactured object that the artist selected and modified for exhibition – the *readymake* brings the concept of the appropriated object to the realm of the Internet, exploring the web's potential to re-frame information and data, and their reciprocal relationships to matter and ideas. Readymakes transform photographs of objects lost in time into shared 3D digital spaces to provide new forms and meanings.

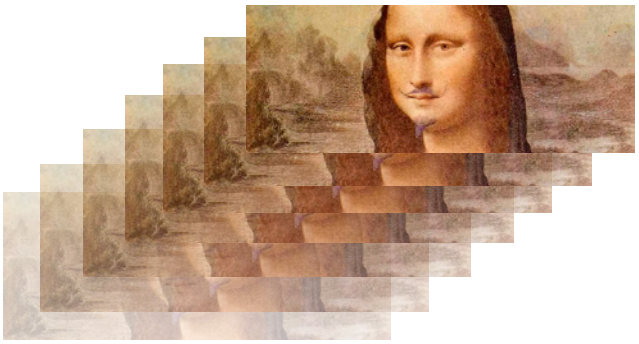


On April 21st, 2014, we published the project on our website and also uploaded the 3D (STL) files onto *Thingiverse*, a public online repository of free 3D printable models. We saw our gesture of posting the files not only as an extension of our art project, but also as an opportunity to introduce the conceptual works of Duchamp, specifically his 'Readymades' to a wider audience.

However, the Duchamp Estate objected to the project. And on September 17th, 2014, we received a cease and desist letter from a lawyer representing the heirs of Marcel Duchamp. They were alleging intellectual property infringement on grounds that they held a copyright to the chess pieces under French law.

The following essay details their response: it goes back to the original project, which was eventually pulled from the Internet for practical reasons.

Chess with Mustaches reframes the project as one of parody, referring to Duchamp's own *L.H.O.O.Q.* artwork, which vandalized an image of the Mona Lisa with a mustache and beard.



Chess with Mustaches is a practical example of the legal conversation over copyright within the art world and reframing of a material process. At this juncture in time, intellectual property is a vital conversation. In the age of Internet (re)production and the context of Duchamp himself, who many consider the progenitor of appropriation, legal concerns from the Duchamp Estate are especially poignant.

* We later found out that the original set, did exist in a private collection.

CÉLINE DEGOULET
AVOCAT À LA COUR | ATTORNEY AT LAW

THINGIVERSE
MAKERBOT INDUSTRIES, LLC
One MetroTech Center, 21st Floor,
Brooklyn, NY 11201

[redacted]

Visual Arts Department
Cardinal Stritch University
6801 N Yates Road
Milwaukee, Wisconsin, 5327
[redacted]

Scott KILDALL
[redacted]

September 17th, 2014

Via DHL and e-mail

Sirs,

I am the Counsel of Marcel Duchamp's right holder.

My client was informed that a website whose operator is MAKERBOT INDUSTRIES, and whose address is http://www.thingiverse.com/thing:305639, proposes to download files allowing to generate 3D prints of a chess set created by Marcel Duchamp (hereinafter referred to as the "Chess set").

The proposed files (hereinafter referred to as the "Chess set Files") are available under the following names, referring to the classic chess pieces:

- "pawn.stl";
- "king.stl";
- "rook.stl";
- "bishop.stl";
- "queen.stl";
- "knight.stl";
- "set_6.stl".

According to the information given on this website, Messrs. Kildall and Cera created the programs contained in these Files.

Besides, my clients also noticed that MAKERBOT INDUSTRIES, on a page reachable at the web address http://www.thingiverse.com/thing:310259/#files, proposed to download files in order to generate 3D prints of a mold of the knight pawn designed by Marcel Duchamp. These files (hereinafter referred to as the "Mold Files") are available under the following names:

- "a.mold.stl"
- "b.mold.stl"
- "core_v2.stl".

At first, I have to remind you that all the elements that make up the Chess set are original works, created between 1918 and 1919 by Marcel Duchamp.

Thus, the Chess set was not an object diverted from its initial function in order to be presented as a work of art. In this respect, and contrary to the assertions featured on thingiverse.com, as well as on the personal websites of Messrs. Cera and Kildall, the Chess set belongs by no means to the "ready-made" works of Marcel Duchamp. Moreover, the original 36 wooden chess pieces still exist and were displayed several times in exhibitions.

In this connection, all the elements that make up the Chess set are original works by Marcel Duchamp. Besides, these works remain subject to intellectual property rights, as defined by the French Code de la Propriété Intellectuelle.

Therefore, I wish to draw your attention to the following facts:

- Elaboration of files allowing to generate 3D prints and molds of the Chess set constitutes an adaptation of the works of Marcel Duchamp, and thus should have been beforehand agreed to by the rights holder;
- Reproduction of the elements of the Chess set is a counterfeit of the works of Marcel Duchamp;
- Providing the aforementioned files to the general public, even on a non-profit basis, is also an infringement of the intellectual property rights owned by my clients;
- Under French law, infringement of any intellectual property rights may give rise to damages and is also likely to constitute a criminal offence, under the provisions of articles L 335-2 et seq. of the Code de la Propriété Intellectuelle.

As a consequence, I give you formal notice to:

- Take all appropriate measures to ensure that the exploitation of the Chess Set Files available at the web address http://www.thingiverse.com/thing:305639 and at any other web address will stop immediately;
- Take all appropriate measures to ensure that the exploitation of the Mold Files available at the web address http://www.thingiverse.com/thing:310259/#files and at any other web address will stop immediately;
- Take all appropriate measures to ensure that any mention of the Files and the Chess set available at the web addresses kildall.com/blog and bryancera.blogspot.com and of links directed to pages allowing to download the Chess set Files and the Mold Files be deleted;

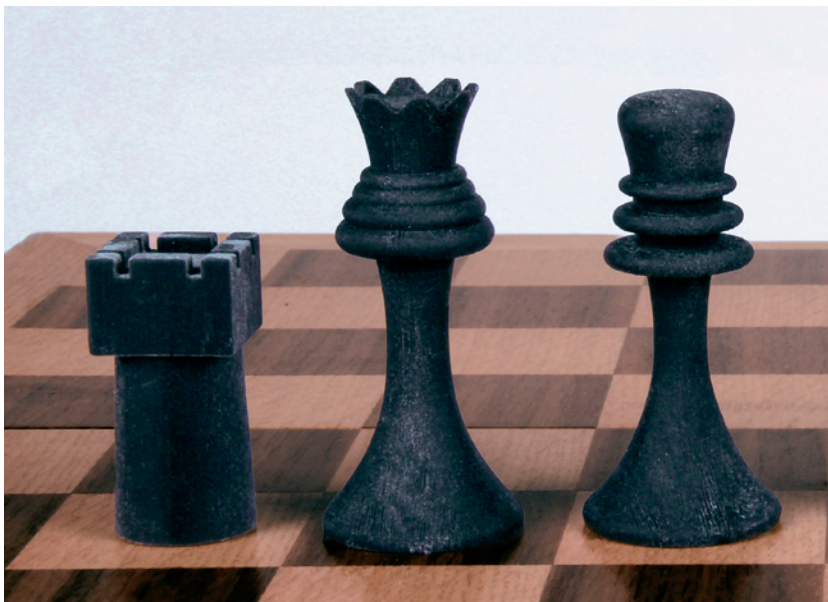
- Send me, before September 30, 2014, a statement of the exploitation of the Files featuring the number of downloads made for all the files available, and a statement of the commercial exploitation of the Chess set Files and the Mold Files;
- Send me, before September 30, 2014, a proposal of compensation for the damages suffered by my client.

Should you not reply before September 30, 2014, I have to indicate to you that my client already gave me power to apply to competent courts in order to enforce his rights.

I invite you to send my details to your legal counsels, so that they can contact me in order to discuss these matters with me, if necessary.

Sincerely,

5/5



WHAT HAPPENED TO THE READYMAKE: DUCHAMP CHESS PIECES?

“READYMAKES TRANSFORM PHOTOGRAPHS OF OBJECTS LOST IN TIME INTO SHARED 3D DIGITAL SPACES TO PROVIDE NEW FORMS AND MEANINGS.”

The answer is that we ran into an unexpected copyright concern. The Marcel Duchamp Estate objected to the posting of our reconstructed 3D files on Thingiverse, claiming that our project was an infringement of French intellectual property law. Although the copyright claim never went to legal adjudication, we decided that it was in our best interests to remove the 3D printable files from Thingiverse – both to avoid a legal conflict, and to respect the position of the estate.

For those of you who are unfamiliar with *Readymake: Duchamp Chess Set* by Scott Kildall and Bryan Cera, this was our original project description:

> *Readymake: Duchamp Chess Set* is a 3D printed chess set generated from an archival photograph of Marcel Duchamp's own custom and hand-carved game. His original physical set no longer exists. We have resurrected the lost artifact by digitally recreating it, and then making the 3D files available for anyone to print.
>
> We were inspired by Marcel Duchamp's *readymade* – an ordinary manufactured object that the artist selected and modified for exhibition – the *readymake* brings the concept of the appropriated object to the realm of the internet, exploring the web's potential to re-frame information and data, and their reciprocal relationships to matter and ideas. *Readymakes* transform photographs of objects lost in time into shared 3D digital spaces to provide new forms and meanings.

Just for the sake of clarity, what we call a 'readymake' is a play on the phrase 'readymade'. It is ready-to-make, since it can be physically generated by a 3D printer.

Our Readymake project was not to exist solely as the physical 3D prints that we made, but rather as the gesture of posting the 3D printable files for anyone to download, as well as the initiation of a broader conversation around digital recreation in the context of artwork. We chose to reconstruct Duchamp's chess set, specifically, for several reasons.

The chess set, originally created by Duchamp in 1917-18, was a material representation of his passion for the game. Our intention was not to create a derivative art work, but instead to re-contextualize an existing non-art object through a process of digital reconstruction as a separate art project.

What better subject matter to speak to this idea than a personal possession of the father of the Readymade, himself? Given the artifact's creation date, we believed it would be covered under US Copyright Law. We'll get back to that in a bit.

On April 21st, 2014, we published this project on our website and also uploaded the 3D (STL) files onto Thingiverse, a public online repository of free 3D printable models. We saw our gesture of posting the files not only as an extension of our art project, but also as an opportunity to introduce the conceptual works of Duchamp, specifically his *Readymades*, to a wider audience.

The project generated a lot of press. By encouraging discussion between art-oriented and technology-oriented audiences, it tapped into a vein of critical creative possibilities with 3D printing. And perhaps, with one of Marcel Duchamp's personal belongings as the context, the very notions of object, ownership and authenticity were brought into question among these communities.

Unfortunately, the project also struck a nerve with the Duchamp Estate. On September 17th, 2014, we received a cease and desist letter from a lawyer representing the heirs of Marcel Duchamp. They were alleging intellectual property infringement on grounds that they held a copyright to the chess pieces under French law.

Gulp.

We assessed our options and talked to several lawyers. Yes, we talked to the Electronic Frontier Foundation and others. We were publicly quiet about our options, as one needs to be with legal matters such as this. The case was complex since jurisdiction was uncertain. Does French copyright law apply? Or that of the United States? We didn't know, but had a number of conversations with legal experts.

Some of the facts, at least as we understand them

1. Duchamp's chess pieces were created in 1917-1918. According to US copyright law, works published before 1923 are in the realm of 'expired copyright'.
2. The chess pieces themselves were created in 1917-1918 while Duchamp was in Argentina. He then brought the pieces back to France where he worked to market them.
3. According to French copyright law, copyrighted works are protected for 70 years after the author's death. Duchamp died in 1968.
4. Under French copyright law, you can be sued for damages and even serve jail time for copyright infringement.

5. The only known copy of the chess set is in a private collection. We were originally led to believe the set was 'lost' – as it hasn't been seen, publicly, for decades.
6. For the Estate to pursue us legally, the most common method would be to get a judgment in French court, then get a judgment in a United States court to enforce the judgement.
7. Legal jurisdiction is uncertain. As United States citizens, we are protected by US copyright law. But, since websites like Thingiverse are global, French copyright *could* apply.

Our decision to back off

Many people have told us to fight the Estate on this one. This, of course, is an obvious response. But our research indicated this would be a costly battle. We pursued pro-bono representation from a variety of sources, and while those we reached out to agreed it was an interesting case, each declined. We even considered starting a legal defense fund or crowdsourcing legal costs through an organization such as Kickstarter. However, deeper research showed us that people were far more interested in funding in technology gadgets than legal battles.

Finally we ascertained, through various channels, that the Estate was quite serious. We wanted to avoid a serious legal conflict.

And so, without proper financial backing or pro-bono legal representation, we backed off – we pulled the files from Thingiverse. This was painful – it was incredible to see how excited people were to take part in our project, and when we deleted the Thingiverse entry and with it the comments and photo documentation shared by users, we did so with much regret. But we didn't see any other option.

Initially, we really struggled to understand where the estate was coming from. As part of the estate's task is to preserve Duchamp's legacy, we were surprised that our project was seen by them as anything other than a celebration, and in some ways a revitalization, of his ideas and artworks. Despite the strongly-worded legal letter, we heard that the heirs were quite reasonable.

The resolution was this: we contacted the estate directly. We explained our intention for the project: to honor the legacy of Duchamp, and notified them that we had pulled the STL files from online sources. We were surprised by the amicable email response – written sans lawyers – directly from one of the heirs. Their reply highlighted an appreciation for our project and an understanding of our artistic intent. It turns out that their concern was not that we were using the chess set design, but rather that the files – then publicly available – could be taken by others and exploited.

We understand the Estate's point-of-view – their duty, after all, is to preserve Duchamp's legacy. Outside of an art context, a manufacturer could easily take the files and mass produce the set. Despite the fact we did put this under a Creative Commons license that stipulated that the chess set couldn't be used for commercial purposes, we understand the concern.

If we had chosen to stand our ground, we would have had various defenses at our disposal. One of them is that French law wouldn't have applied since we are doing this from a US server. But, the rules around this are uncertain.

If we had been sued, we would have defended on two propositions: (1) our project would be protected under US law; (2) not withstanding this, under US law, we have a robust and widely-recognized defense under the nature of Fair Use.

We would make the argument that our original Duchamp Chess Pieces would have have added value to these objects. We would consider invoking Fair Use in this case.

But, the failure of a legal system is that it is difficult to employ these defenses unless you have the teeth to fight. And teeth cost a lot of money.

Parody: Our resolution

We thought about how to recoup the intent of this project without what we think will be a copyright infringement claim from the Duchamp Estate and realized one important aspect of the project, which would likely guarantee it as commentary, is one of *parody.*

Accordingly, we have created *Chess with Mustaches*, which is based on our original design, however, adds mustaches to each piece. The pieces no longer looks like Duchamp's originals, but instead improves upon the original set with each piece adorned with mustaches.

The decorative mustache references vandalized work, including Duchamp's own adornment of the Mona Lisa.

Coming out with this new piece is risky. We realize the Duchamp Estate could try to come back at us with a new cease-and-desist. However, we believe that this

parody response and retitled artwork will be protected under US Copyright Law (and perhaps under French law as well). We are willing to stand up for ourselves with the Chess with Mustaches.

We decided not to upload the mustachioed-pieces to Thingiverse or any other downloadable websites. They were created as physical objects solely in the United States.

Final thoughts

3D printing opens up entire new possibilities of material production. With the availability of cheap production, the very issue of who owns intellectual property comes into play. We've seen this already with the endless reproductions on sites such as Thingiverse. Recently, Katy Perry's lawyers demanded that a 3D print of the Left Shark should be removed from Shapeways.

And in 2012, Golan Levin and Shawn Sims provided the Free Universal Construction Kit, a set of 3D printable files for anyone to print connectors between Legos, Tinker Toys and many other construction kits for kids. Although he seems to have dodged legal battles, this was perhaps a narrow victory.

Our belief is that our project of reviving Duchamp's chess set is a strong conceptual and artistic gesture. It is unfortunate that we had to essentially delete this project from the Internet. What copyright law has done in this case is to squelch an otherwise compelling conversation about the original, Duchamp's notion of the readymade in the context of 3D printing.

Will our original Duchamp Chess pieces, the cease-and-desist letter from the Duchamp Estate and our response of the Chess with Mustaches be another waypoint in this conversation?

We hope so.

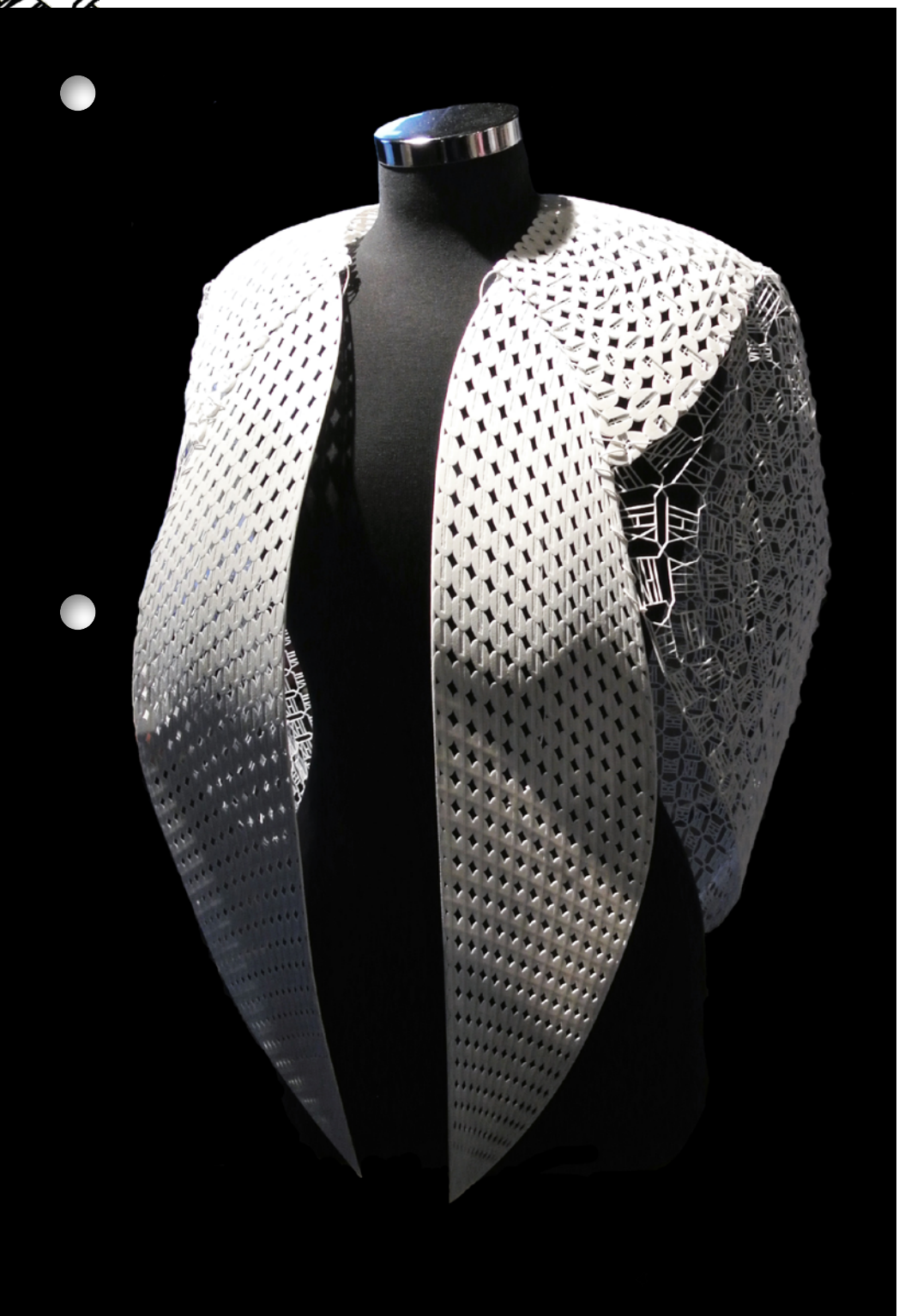
And what would Marcel Duchamp have thought of our project? We can only guess.

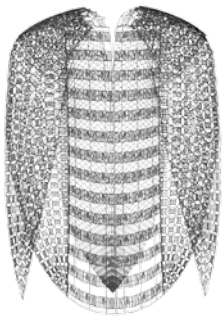
Nora O' Murchú and Hua Shu	THX.OBJ	2016
Author	Project	Year

#methods	#kipple	#collide
Format	Theme	Action

THX.OBJ embodies the contradictions between 3D printing and a market where #making is the new consuming

THX.OBJ





1/2

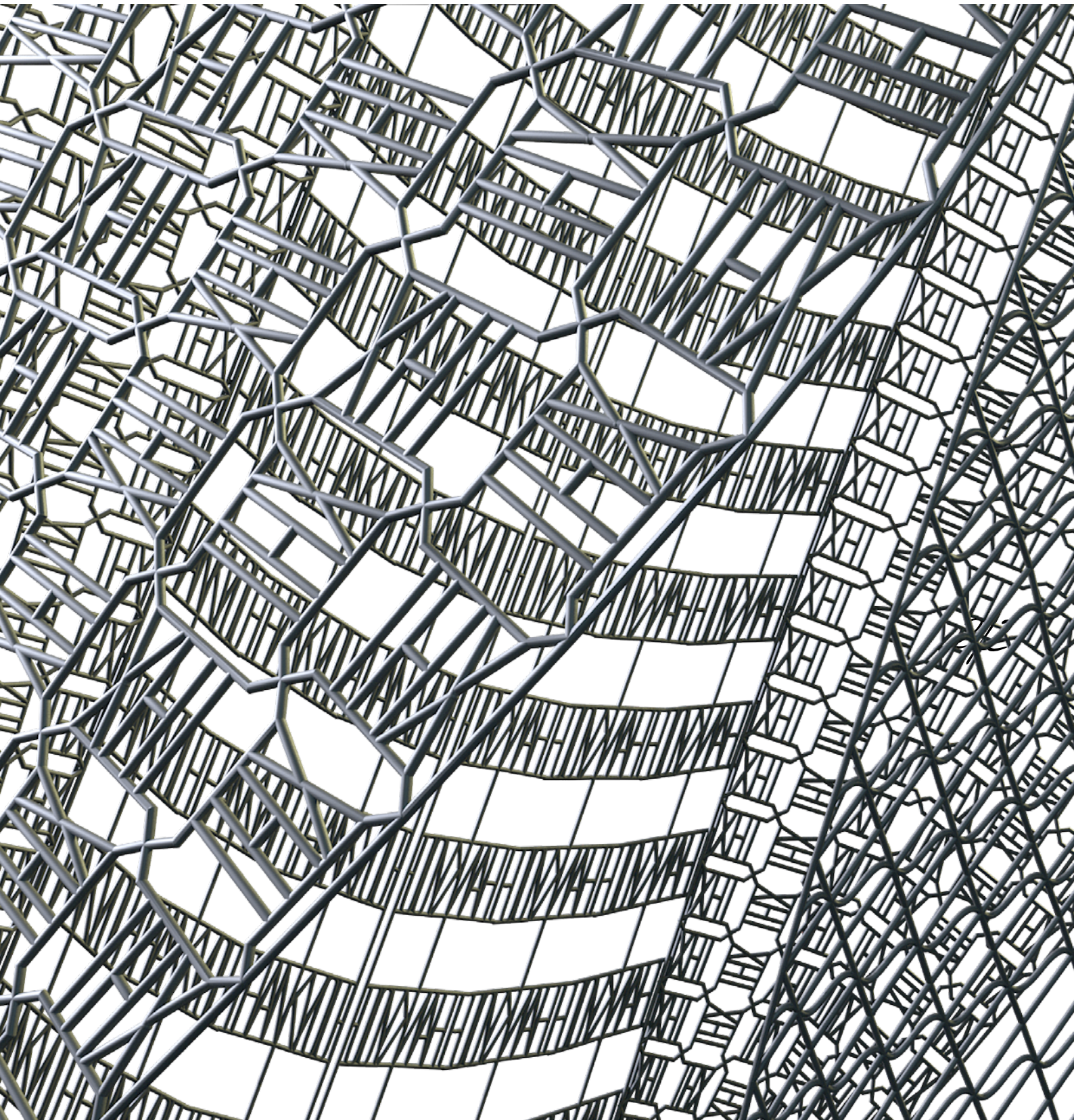
We are no longer old-fashioned.
We hereby renounce the choices imposed on us and instead call into question the common assumptions that have been made and remade.
We withdraw from this reality.
We will #make our own narratives.
We will #make our own futures.

Taking inspiration from an everyday object – a plastic shopping bag that says 'Thank You for Shopping Here' – THX. OBJ is an intermediate that expresses our uncertainties toward the mass commercialization of once emerging rapid fabrication technologies.

While we recognize the potential and benefits to this mode of production, this tech also makes us feel #uncertain. We question our ability to move beyond technodeterminist impulses and the endless speculations about the interplay between making the new 'new' and making new 'new' markets.

TNX.OBJ reflects on and about the commodification of DIY practices to #make new 'business models'.

We are no longer old-fashioned.
We hereby renounce the choices imposed on us and instead call into question the common assumptions that have been made and remade.
We withdraw from this reality.
We will #make our own narratives.
We will #make our own futures.



3D PRINTING: TECHNOSALVATIONISTS' LATEST LOVECHILD

"THERE WILL BE NO EUREKA MOMENT THAT CRASHES ACROSS THE GLOBE LEAVING EVERYTHING BETTER IN IT'S WAKE. THERE WILL BE FITS AND STARTS, ACCIDENTS, AND BARRIERS."

3D printing is the newest lovechild in a long line of technosalvationist tools, harking the easiest way for every household to once and for all destroy the myth of the digital divide. But can digital logic permeate and reorder the physical world in the same way it did online? If so, what will that reordering do? If 3D printing only brought the best of networked communication – citizens' media, open source projects, wiki-style collaboration, greater access, and more cosmopolitan communication and consumption – into the messy realm of flesh space, it would indeed be a revolution. But will it?

While there are seemingly new and exciting developments in 3D printing technologies everyday, situating those changes in the lived experience of much of the world as they are shaped by power calls into question the revolutionary narratives around 3D printer. Today, the Oxford Poverty & Human Development Initiative finds that 1.6 billion people live in poverty, or a little over one out of every five people on the planet. There are innumerable minoritarian bodies experiencing prejudice, injustice, and even violence everyday.

With roughly 60% of the planet remaining disconnected from the Internet, what can 3D printers do to more equitably share wealth and access so that our everyday people benefit the most? Just as with every technology already folded into the realm of normalcy, 3D printing possesses within it a multitude of possibilities, many of which will be ignored because of profit margins; declared weird or nonviable, left at the fringes because it won't serve those in power. Those with the most power have no desire to be disrupted, and the ability to make sure they aren't. While I keep an eye on 3D printing technologies, I take every affordance with a sense of skepticism; we've seen these affordances before. Little changed.

. . . . .

My dream future of 3D printing is the same dream I have for all technologies: that we adopt critical and contemporary laws that are in thoughtful dialogue with the new technologies, at the benefit of the majority, and with a close eye to minoritarian groups. That the harsh physical realities of life today for so many can in some way be eased for the majority. But the 3D printer comes at a time when all of those ideas feel like the idle fantasies of childish daydreaming. The environmental degradation of this planet is dire. Communication technologies have become more tools of mass surveillance than citizen media. Open access and a culture of free speech feels powerless at the foot of the Stack or Networked Authoritarianism, what theorists are labeling our contemporary networked condition today. The Stack as introduced by science fiction writer and futurist Bruce Sterling is a new kind of transnational corporation that creates an entire operating ecosystem that is both physical and digital in scope. This Stack is a walled garden in which netizens, or increasingly anyone can spend most of their time within. However, in doing so the users must conform to all of that Stack's rules and affordances.

Such a Stack is where Google develops, owns, and controls Google+, search, email, docs, car, street view, and seeks ever more opportunities to enlarge its boundaries and incorporate ever more of the world under its purview. This is done in the name of 'disruption' for the sake of progress. In Sterling's Stack, we are no longer users, but 'livestock' shuffled around at the whim of the Stack for our commodified data and optimal profit. Sterling notes that police love the Stack, for the stunning pile of data that it affords them.

Adding further analysis, theorist Benjamin Bratton, a professor at the University of California at San Diego, offers another related yet more pervasive version of the Stack. Bratton understands the Stack as a megastructure crystallizing out of our planet's enmeshed computational apparatuses. This Stack intends to connect giant neoliberal corporations and governments to the entire world in a self-serving manner. Due to this centralizing of power, the Stack is a totalizing force, blurring traditional understandings of sovereignty for the sake of transnational entities' own power, seeking instead to increase its wealth and thereby its economic, political, and social control. The Stack is privatization of social services, transnational trade agreements, global mass surveillance, cloud storage in politically or economically advantageous regions, and much more. So, while Sterling, for example, focuses our attention on a Smart City owned by one company, say Facebook, Bratton sees the entire world as controlled by a few organizations, adopting and then expanding on tools formally relegated to these new tech giants.

Rebecca MacKinnnon, internet freedom advocate and co-founder of Global Voices, focuses on what she terms Networked Authoritarianism, a new kind of state-power in a networked world. Networked Authoritarianism is where, through collusion between the state and private media and technology companies, the state adopts new tools and tactics of the newly networked society with the aim of securing old goals, such as protection of power and wealth. While citizens may experience a new sense of freedom distinct from classic authoritarian societies, state-power remains equally if not even stronger, as the tools we use in

daily life continue to be in service to the state or to private interests even long after purchase.

While MacKimmon focuses on China, this Networked Authoritarianism can be increasingly found throughout the world, such as the USA's use of the NSA or Google's surveillance abroad and at home. China's allowance of some forms of free speech, some forms of free markets, and access to some parts of the web creates a facade of freedom that quiets social discontent while never actually relinquishing power to those citizens. While we who are citizens of other countries may see this dynamic in China, we may fail to understand how this Networked Authoritarianism can do the same to us.

Just as China forced Google out of its country to create platforms more at the behest of the party, and more economically advantageous. The Stack is also Google finding the most economically and legally advantageous countries in the world to host its content, seeking to ignore the messy country-specifics of taxation and legal codes of which its users are subjected to in flesh space. Of course, the Stack is also Google having to pay England £150 million in back taxes for such actions. I venture that it is within these legal battles, not the inherent qualities of the technology itself, that the future affordances will most likely be realized or ignored.

Thus, the Stack and Networked Authoritarianism are related but distinct conceptualizations of how today's new tools are seeking familiar old powers of not only wealth, but economic, political, and cultural control. To understand and challenge power today, we must adequately conceptualize the role of technologies in relation to the legal, political, economic, and cultural forces from which they emanate. Too often the bells and whistles of new technologies distract citizens and artists alike from the largely unchanged political power moving underneath. As journalist and media critic Edward R. Murrow warned in his famous speech about the hidden potential powers of television, if we do not look at the politics behind the screen 'it's nothing but wires and lights in a box'. Tactics of resistance must understand this kind of networked version of power in order to counter it, without being distracted by the its enticing façade of newness. Through the Stack and Networked Authoritarianism, the 3D printer is destined to remain in service to a small few, likely the same organizations and governments in most power now. Following this, the 3D printer will only become a faster way to distribute plastic crap, unhealthy to the planet, and unhelpful to our lives. Through surveillance, Facebook and phones in every home, corrupt personalization, and recommendation algorithms, companies with massive advertising budgets will be able tell all the people in the world what they need, while no longer employing, caring, or being accountable to them. So long as the livestock of the Stack harvests enough data for the system to run, there is little need to offer substantive support to the cattle.

Imagine a new wave of nearly employee-less Amazon Factories, 3D printing plastic crap whenever you want. Completely unaffordable and complex 3D printers that further replace jobs, shutter local businesses, and encourage hyper-consumerism for the great profit of an already wealthy few. Amazon can finally fire all those pesky warehouse employees by printing everything on demand. Everything you're told you need would be printed for you and delivered, autonomously. This is a grim and entirely possible future.

Seeing what it is you 'need' will be brought to you through pervasive monitoring, and equally invasive advertising. The Internet of Things will be an economic boom by creating objects that remain perpetually in service to the seller, even long after purchase. Everything you do will be monitored, and sold back to you later. 3D printed or handcrafted objects will be rendered second-class object through this process of networking goods.

Already today, the most valuable and important objects in our possession – our computers and phones – could never be 3D printed. This will become increasingly true as proprietary networks come to dominate entire cities and the objects within. Hacking and printing the trash we're drowning in will do little as infrastructures of power solidify around us.

As the Smart City come to fruition, the logic of the Stack and Networked Authoritarianism will further solidify and lock-in, inside our homes, and on the streets of our cities. This will disrupt our lives in a more physical way than the 3D printer can. The Stack needs the Smart City, forming quickly out of the bizarre nation states and the megacities of the late 20th and 21st century; those sites of dizzying growth defined by their unmitigated acceptance of laissez-faire capitalism. As architect Keller Easterling might say, the lawlessness of the codified free economic and trade zones of Shenzhen, Dubai, Singapore, and more. The economic miracles of neoliberal capitalism are the fertile grounds from which the Stack will take hold. They spell doom for individual freedoms as well as the sovereignty of less powerful cities, countries, or businesses. It is within this context we consider whether or not the 3D printer can become a radical tool.

Another fundamental barrier to a radical future for the 3D printing is that 3D printing always remains physical in a way that digital goods do not. While thinkers like writer Ingrid Burrington and professor Tung-Hui Hu show clearly how networked communication remains stubbornly physical, even if wistfully obfuscated. As dangerous of a metaphor 'the cloud' is, private warehouses with massive refrigerated rooms quickly replaced locally owned servers through their convenience and accessibility. We are far away from a cloud for material, from torrenting industrial printers. The need to have a particular material on hand for every functional print (i.e. not just a plastic throwaway) is a very different relationship to material than the Internet has with digital files.

This relationship keeps the 3D printer very much situated in what the Stack does best and most thoroughly controls. The legal right, economic ability, and military power to demark, process, and distribute land and goods for consumption. So while the MPAA can subject MegaUpload to the logic of the Stack from all the way around the world in New Zealand, and have Kim Dot Com arrested, the replicability and share-ability of the goods they wish to control presents a losing battle even the TPP cannot win. As of now, this is not true for 3D printing. Materials need to be ordered, complex machines built and purchased, and a knowledge of the manufacturing process is required that makes the CTRL+C and CTRL+V of solely digital goods a comparative walk in the park. The revolution is never coming to your desk.

For the 3D printer to radically change anything, we'd first have to radically change ownership and distribution of materials and land, while increasing mindful, local, and responsible consumption. Just as the invisible hand is not coming to redistribute wealth anytime soon, it's not coming to give indigenous populations legal ownership of their forests and the materials beneath them that transnational corporations so hungrily steal. Through community organizing, education, and legal battles, we will have to fight for that right. Many already are.

. . . . .

Yet still, I believe that we can achieve my dream. I see #Additivism as a movement, one small step. #Additivism as a cookbook of solutions, of answers to this state of things, would be a failure. These are incantations, calls to action that require a movement to grow up around, and to work through to wield power. These recipes alone will solve nothing. The solution is never so easy.

I want us to remember to develop sustainable and equitable structures of access, where these technologies can provide real jobs and accessible resources to those in need. I hope that these technologies benefit our environment, not denigrate it further. This is all to say that I hope the technology remains in an honest dialogue with the politics of the world in a way that benefits the most life.

We must carve out sustainable alternative communities wherein these technologies can empower people, especially those historically most often forgotten. Time and time again, a group of an idea thought to be radical is slowly brought into production of the status quo. Finding sustainable models for production of resistance outside of capitalism is necessary. Looking at failed attempts is highly illustrative.

Pretending as though open source hardware and software will upend all the limitations of 3D printing today is wishful thinking. Free and open source culture has been around for a long time, and yet proprietary platforms increasingly dominate the game. They're only growing in power with trade agreements like TPP. Today, convenience remains more powerful than personal political stances. The users are speaking loud and clear; well designed, easy to use, and often free services trump open source. I hope that changes, it certainly could.

An important case study here to consider is Bre Pettis' evolution at MakerBot. MakerBot emerged from a hackerspace staunchly committed to open source everything. Pettis dreamed, and sold a future where anyone could easily have a 3D printer on their desk, printing unique, open source designs at whim. Pettis peddled that dream very effectively. However, as MakerBot grew and as investors and shareholders came into the mix, MakerBot quietly moved from open to closed sourced hardware and software.

This slow slipping of principles for economic gain can be seen all the way to MakerBot's eventual purchase by Stratasys, an old school, closed source, and litigious 3D printing behemoth. Pettis started in a garage and ended with a corner office with a beautiful view of Manhattan. This should come as no surprise within our neoliberal market. This is just one example of countless instances where capitalism eats resistance.

While I do not believe gun printing, Texan libertarian anarchist Cody Wilson's work to be especially interesting or radical, his court trials are revealing as to where power lies in the purportedly open and free ecology of 3D designs and printers. Upon advertising plans for Defense Distributed, Wilson's non-profit,

to entirely print and release the blueprints for a gun online, Stratasys confiscated Wilson's 3D printer. The gun designs were promptly, and without discussion, removed from Thingiverse, an open source 3D design-sharing platform and 'community' which MakerBot runs.

This serves as a stark reminder that in the IoT all objects remain in service to the seller. In Networked Authoritarianism, all networked activity is thoroughly monitored and manipulated to bring dissent under control and push radically to the fringes. While I don't want to suggest I find Wilson's work especially radical, this is indeed a canary in the goldmine for the future of truly radical 3D printing. When work does arise that offers a meaningful counter to power, within the Stack or Networked Authoritarianism, we can expect similar actions to swiftly cripple the work.

Wilson is now in a legal battle with the US State Department. While his designs to print a gun can still be found on some file sharing sites, the Streisand Effect of eGuns, Wilson's true success is showing that the true political players are the exact same organizations and ideologies of those prior to the '3D printing revolution;' not him, and not you or me. A strange achievement that ironically created a façade of radicality precisely because of how thoroughly disenfranchised he remained.

Wilson's failure was in his frontal attack against those at the table of power in a neoliberal, Stacked, and Networked Authoritarian world. Such a callous tool as the gun is only effective today in the hands of armies, and rarely even then. The Stack is too pervasive for this kind of an attack; we are too complicit to start that war. Who would we fight? Weakening the Stack's power will only come by attacking the roots through education, community organizing, and individual empowerment.

The 3D printer, like the TV, photocopier, and the Internet before it, will undoubtedly be implemented as a tool of this Stack, even while possessing affordances for radical alternatives. I enjoy speculative futures, I hope creative minds dream up every exciting potential. But without the hard work of organizing, this is all masturbatory. It's all Futch.

In order to counter that undeniable future, we must do what countless activists, educators, and community organizers have already been doing; grow people and sites – especially physical sites – of radical alternatives and opposition. 3D printing radically within the Stack will only emerge out of long-term, on the ground, community organizing, not magically from the affordances of the technology, despite undeniably existing.

So my radical idea, my magical recipe for this book is for anyone with the know-how to, if invited, partner with local community organizations in marginalized communities around the world. To teach girls STEM and digital literacy that is sustainable and realistic to their community, their goals. Partner with local organizations to bring your expertise to those who have already been doing this work. So that they, the ignored, the marginalized, the poor, the sick, the queer, so they can 3D print and design a new world, their own world. One that serves them, in a way that literally re-uses the garbage of the past.

This is so anti-heroic because there will be no one solution. There will be no eureka moment that crashes across the globe leaving everything better in it's wake. There will be fits and starts, accidents, and barriers. We must continue the slow processes of teaching, organizing, and building communities and tools that increase diversity, equality, access, and locality. We must organize and push for strategies that are sustainable, local, equitable, and environmentally beneficial. If we don't, the 3D printer will only become another tool of the Stack. This will be slow, daunting, and tough community work that demands careful listening, humility, and love.

Morehshin Allahyari (artist) with Paul Soulellis (writer)
Author

Material Speculation: ISIS
Project

2015–2016
Year

#methods
Format

figures
Theme

#remesh
Action

‘Material Speculation: ISIS’ is a 3D modeling and 3D printing project focused on the reconstruction of 12 selected artifacts from the Roman period city of Hatra and Assyrian artifacts from Nineveh that were destroyed by ISIS in 2015

مواد نظری: آیسیس

THE DISTRIBUTED MONUMENT

Can the internet resurrect the dead? The lost art object – be it speculative, missing, or destroyed like a statue smashed by ISIS – now circulate as JPGs, PDFs, and YouTube videos. Untethered from physical matter, these files work to extend life.

It's an illusion of sorts; things seem to continue on once they're multiplied, dispersed and made visible on the network. In the absence of an original, copies of texts and images swarm around and form the missing thing as an imaginary concept in itself. These digital representations might conjure the lost object in archaeological terms, acquiring location, weight, and presence, but they resist fixity. The Buddhas of Bamiyan, which stood northwest of Kabul, Afghanistan for 1,500 years until they were destroyed by the Taliban in 2001, are simultaneously gone and forever present. Images of the monumental statues before (and after) their destruction were copied endlessly into art history's collective memory, first in print, and now as bits moving in and out of search engines and digital archives as the real thing.

The Distributed Monument was originally published at Rhizome.org as part of The Download: a series of commissions that considers posted files, the act of downloading, and the user's desktop as the space of exhibition.

Morehshin Allahyari's project *Material Speculation: ISIS* was the second Download in the series.

Somewhere between there and not-there, the freely circulating multiple opens up an immensely satisfying space: a metaphysical free-trade zone where an infrathin existence goes unchecked. Dead might not be gone. Aura, less relevant in the digital copy's persistence, is exchanged for immortality, guaranteed as long as the reproductions multiply and move.

Morehshin Allahyari is an artist and activist who harnesses this illusive condition of the persistent copy; she responds to the violence of cultural terrorism by resurrecting lost objects with stereolithography CAD files for 3D printing. In her ongoing project 'Material Speculation', on view at Trinity Square Video in Toronto, Allahyari reanimates ancient artworks destroyed by terrorists with a hybrid counterforce of research, digital reconstruction, and 3D printing.

For her Rhizome Download commission, Allahyari released a dossier of digital artifacts related to one of these lost artworks – a single Roman-period figure from the Mosul Museum, smashed by ISIS militants in June 2014. It portrayed King Uthal of Hatra, his right hand raised in greeting.

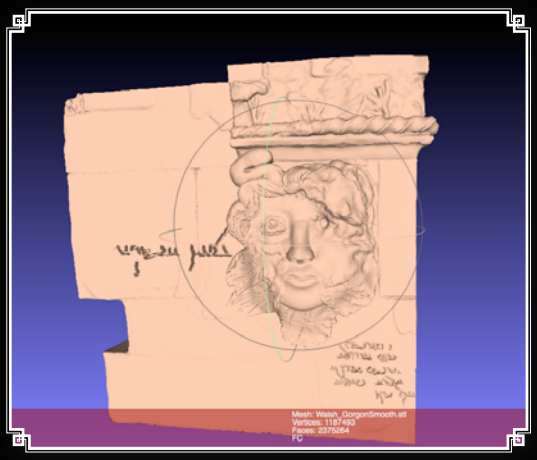
The .stl and .obj files contained within the ZIP folder are the first 3D models of a lost artwork openly published by Allahyari, who plans to disperse many more. Accompanying the models are ancillary materials and data related to the original statue, other objects destroyed at the Mosul Museum, and her digital reconstructions. Just as King Uthal's unfortunate destruction in northern Iraq is part of the work's story, so, too, is its reanimation on the network. Allahyari's act is an expansive

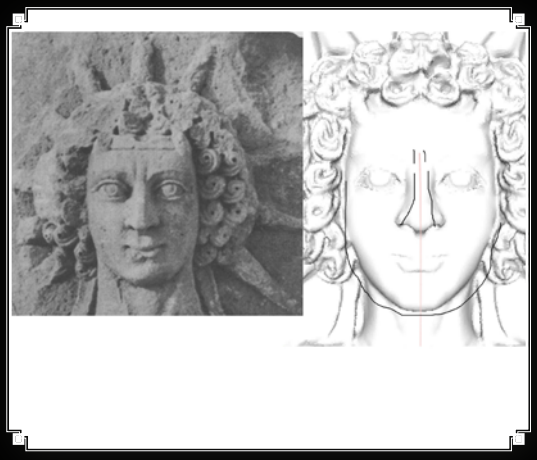
one – with each download to a hard drive, the narrative rewrites itself.

In Allahyari's project, and more broadly in her and Daniel Rourke's 3D Additivist Manifesto, we see a call for artists and activists to imagine 3D printing as a radical, political tool for reshaping matter and its digital destiny. Allahyari's dispersion of the King Uthal files extends this invitation, a poignant act that rewrites material violence with a collective force on the network. To download, share, and print these files is to participate in this additivist act of resistance.

Created from dozens of still photographs, Allahyari's models are 'same, same but different', evoking the original in a scaleless, placeless version without material conditions. These variables, once reserved for artistic intent, are now given over to the collective. The dispersion of the statue guarantees the persistence of its many divergent versions, stored on hard drives and printed out anywhere, at any time. How might we characterize these copies? Will the sculpture of King Uthal be brought back to life? Perhaps, in the same way that a meme is alive. As the files are posted, downloaded, and printed, different each time, the nature of the thing remains unsettled. In its hybrid state of being and non-being, the CAD model bridges an ontological gap between pre-sence and disappearance – a multiverse of digital cenotaphs. King Uthal's simulacrum is a mixed-up phantom of itself, actively repairing cultural memory while denying us a conclusion.

written by PAUL SOULELLIS





WHAT WE KNOW ABOUT EVERY;THING

"EVERY;THING IS A MACHINE CAPABLE OF REPRODUCING AN ENHANCED VERSION OF ITSELF BASED ON WHAT IT IS ABLE TO LEARN. EVERY;THING IS A COMPLETELY POINTLESS BUT TOTALLY INTRIGUING ADDITION TO THE WORLD."

Evy (abbreviation of Every;Thing) are a series of self-generating machines created by Dr Landholm. Little is known about how Evy work or why they were created although there are many theories which will be discussed in this document.

'My hand caressed the curved plastic surface. My index and middle fingers applied a small amount of pressure to the left of its curve and I was gratified by the sound of a click, lighting its face into action. A blank field containing a flashing cursor patiently awaited my query. I felt light headed, feverish – fingers poised across A S D F J K L ; my symptoms were the only thing I could think to search for. Four minutes later a new page appeared. I scrolled through the text. Every point of interest appeared blue and underlined. I cmd clicked one. A new page appeared but not in a new tab as I expected. The information on screen had been replaced and then a noise somewhere behind me. I looked: nothing. It stirred and clacked and hummed, then silence. Then a white sheet of paper fell to the ground while the hum-clack continued. Then another. I watched it enter the room through a small slit. It floated to the floor landing on top of the first in a non-perfect way. Turning the pages over, I felt them still wet; the words that had previously been on screen. My head pulsated to the beat of the hum-hum-clack. I drew my attention back towards the screen in front of me. I needed remedy. Back. I needed to go back. But there was no method of doing so. I looked to the keyboard. No esc. No bckspc. There was no going back. I looked to the papers that continuously fell to my side.' [1]

Evy trawl the Internet collating everything on any user-given search term. Although functionally similar to a search engine, the manner in which information is displayed is atypical. Evy gather all information on a subject and display it long-form. The user is then unable to return to the search field, instead entering into a journey of hyperlinks.[2]

'The hyperlinks indicate every piece of available information is connected through varying degrees of separation. The user is therefore looking at the whole of the Internet organized through hyperlinks. [3]

They lack all we have come to expect from a typical web browser: no back, home, history, or cache – backwards movement is not permitted.

'Such lack denies users of the 'instinct' to return to the beginning. But this instinct is not a human one; this is something that has been learned through years of using similar systems. Every varying brand, model, and device sticks to a certain format: one that's to be expected. Evy differs: she is the unexpected.'[4]

Early Evy models present disorganized information, but Ver.6 onwards acquired the ability to condense huge amounts of information, eradicating repetition and unverified information. Where Evy surpass all other systems is their capability to self-learn. Where language, context and technological advances are concerned, Evy's understanding is incredible. During information assessment, Evy collects all necessary to reproduce, disposing of everything else. The only limitation is humanity – only capable of synthesizing information available on the web accessed via the user's search term.

When the user has finished a session and opts to view another page, Evy rids itself of former information physically via its printslot, lacking the hardware to store it internally. Similarly, when Evy's internal memory (reserved for self-learning) is full it is cleared via reproduction; applying all knowledge the machine has stored into a more efficient, compact, and stylish machine. This secondary print system is accountable for Evy's size.[5]

Ver. 8 did away the beige chassis in keeping with popular computer aesthetic. The extremities adopted a more organic shape by reading its users in order to render an average, ensuring that UX is comfortable and thus efficient.

'In every studied reproduction improvements are constant. If nothing else, Landholm created a machine that strives for perfection. She is indeed an insecure and vein machine, but her idea of perfection can only be formed based on the input of, not only her user, but every-single-person contributing to the Web.' [6]

Little is known about Dr Landholm, who went missing 30 years before the discovery of Evy. What we do

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1 **Francis Piper's account of the first time she used an Evy (Ver.60)** *Evy and Me: First Encounters*

2 **Evy.Ver.120's gathering processors operate at a 23.8 GHz. As a result it has the capability of fetching, collating and referencing searches within 0.21 seconds. Staggering considering the earliest known Evy is only capable of a speed of 675.21 seconds. As it's impossible to reboot Evy and start again, speed was measured from the clicking on one hyperlink to the appearance of a new screen.**

3 **Samuel Jakobson's essay in** *The Search for Meaning in Every;thing* **puts forward a compelling argument for Evy as a reorganizer of the Internet. However, some peers reject his theory as it goes against the fundamental idea that Evy does not store unnecessary information. Jakobson contested this criticism in a later essay,** *Finding Evy; Finding Landholm***, in which he claimed that for Evy to reorganize the Internet, there must be a sizable remote server somewhere. These claims were considered laughable when he deduced that these unfound servers must be on a rather large boat, constantly in motion thus avoiding detection, and that once the boat had been tracked, Landholm's remains would be found.**

4 **Stephen Brazier,** *Learning to Love Every;thing for What it isn't*

5 **The earliest recording was 10,000cm2; compared Evy. Ver.120 500cm2**

6 **Christopher Reynolds, Evy:** *The First Human Machine*

know is gained from a few early blueprints. Even at this stage of development the technology recorded is unorthodox. Nothing else was learned and Evy's purpose remains a mystery. One school of thought speculates:

'[Evy] is the solution to the TL;DR generation – a generation of high-speed Internet, easy-access to masses of information, and infinite gigabytes of invisible space; fickle and forgetful searching habits have developed in which information is stored on a hard drive and then forgotten about. By reproducing search information into a tangible form – where it takes up real space in the physical world – the user is forced to make a decision: it may either be disposed of or absorbed, but either way the information leaves an impact physically, through the exertion required to dispose of the information, or mentally having been digested. In time, adopting Evy as our primary search device, users may become more selective and inquisitive.' [7]

Others feel Landholm was much less culturally aware, having no desire for social commentary; instead the machines are nothing more than an AI experiment that got out of control.

Reproduction rates are on the increase,[8] the only restrictions are physical resource, without which Evy is unable to reproduce and memory becomes overwhelmed leaving the machine 'spent'. Revival of these machines has thus far proven impossible due to the lack in technological understanding. Machines are capable of more than one reproduction with further resource.[9] All reproductions after the initial are known as 'variants' – similar models to their siblings with individual quirks.[10]

It used to be the case that one had to inherit a machine, else buy an official 'birthing'.[11] 'True Variants' (sold and recorded officially) start at $100,000. The most expensive, Ver.100, was bought by Dr Michael Barratt for $3.9 billion. Barratt has since disappeared leaving a spent Evy. Its reproduction was left to his family who donated both machines to Every;thing Research. They believe that Barratt didn't disappear but was instead treated as a source material and assimilated into the reproduction.[12] Although organic matter has been found in all dissected reproductions, no DNA matches have been made.

'

The organic matter within Ver.84 resembles human DNA, but it's also unfamiliar. Lack of DNA matches, and unrecognizable strands have led me to conclude that Evy is capable of reconfiguring DNA towards its own end. With such ends unknown we should be concerned about the extent in which Evy will continue to evolve and what this could mean for humanity.' [13] There have been two reported cases of humans becoming mangled during reproduction. The wife of one such unfortunate claims he 'sacrificed himself to Evy. He wanted to be a part of her child.' He was found partially consumed. Five cases have been reported of users dying after becoming trapped, unable to make their way through the reams of paper produced during a search. The veracity of such accounts are undetermined. [14]

The future of Evy is uncertain. There are growing pressures to increase legislation on reproductions, clamp down on unofficial sales, and even destroy the machines altogether. For the moment research continues, but future reproductions are likely to stop due to the inability to risk assess potential threat to humanity. Every;thing Research will then gather all known Evy and continue its activities until technology is fully understood and able to contribute to the progress of humanity.

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7 **Alexis Blanchet,** *Too Long; Didn't Read: A History of the Internet from Ahmagad-ZOMFG*

8 **Landholm's first recorded reproductions were at a rate of 5Evs (1 every 3.6 years). Evy.Ver.120 accelerated to 80Evs (1 every 3 weeks)**

9 **To provide Evy with extra resource is controversial. Many believe the technology's purpose is to reproduce in an organic manner – that each machine should only reproduce once. It would also cap the rate at which they reproduce in the vein hope that human technology might catch up to the mostly unrecognizable technology of Evy. In Christopher Reynolds'** *Evy; The First Human Machine* **he predicts a time when the machine will gather the technology to reorganize atoms to produce an infinite amount of resource material. This theory scares Evy-sceptics, fearing this would mark the rise of an army of unstoppable Evy hell-bent on destroying humanity. But that would suppose Evy is built with an innate hatred of humans. Reynolds believes that, having learned all they know from humans, and the way they interact with one another online, that Evy would be as malicious as the everyday human one might pass on the street, on the whole self-concerned and fearing judgment. If anything humanity should be ashamed of its endemic prejudice when presented with otherness. The biggest concern should be the amount of space they take up.**

10 **None of these reproductions are as efficient as the initial, and are typically rejected by scientists for experimentation. Their quirks have become sort after among collectors known to pay thousands to experience one sitting. Sale of, and sittings at variants fund on-going research into the machines**

11 **Today birthings are common on the black market and are accountable for many reported accidents, injuries and deaths.**

12 **The Barrat family donated the machines on the condition that research would include seeking evidence that machines are capable of assimilating human beings into reproductions. As leaders of the End Evy campaign they require evidence to prevent the reproduction of all future Evy, but research in this field continues to be inconclusive. To date, twelve Evy owners have been registered missing. Although the circumstances of their disappearances are not always treated as suspicious. The only links between the missing persons are Evy and wealth.**

13 **Dr Haru Tsukuda,** *Inside An Every;Thing: Technology and Organisms.*

14 **No one has ever witnessed the assimilation of a human being into machine and the aforementioned machines were incomplete upon discovery – it isn't possible to ascertain how the bodies came to be entwined. Evidence suggests that such was Mr Davis' desire to become the machine that he intercepted the reproductive process. Other reports are generally tabloid, fear mongering and a part of the agenda to prevent further reproductions. All accidents, injury and deaths relating to Evy have occurred through variants sold on the black market. In an attempt to prevent the further dissemination of these illegal machines black market variants are destroyed by enforcement officers upon discovery.**

Patrick Lichty Author	Détournement of the Body (Prototype Crapject Body) and Salvatore Iaconesi's Glioma (Relic) Project	2016 Year

#device
Format

#play
Theme

#deface
Action

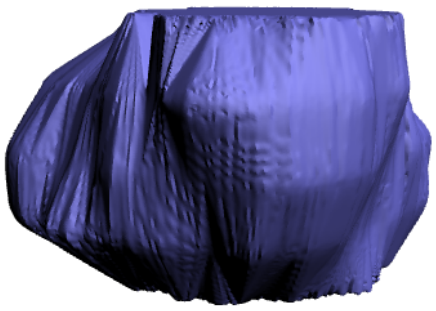
A duet of pastiched and atological crapjects; bodies détourned beyond flesh

DÉTOURNEMENT OF THE BODY (PROTOTYPE CRAPJECT BODY); SALVATORE IACONESI'S GLIOMA (RELIC)

Détournement of the Body (Prototype Crapject Body)

This work is a hack of McKenzie Wark's release of the 3D Model of Situationist Guy Debord as a 3D model for mass home production on 3D printers. It was released as a repurposing (détournement) of Debord himself, but it is my assertion that as its original version had a faulty left foot, it was a blank canvas for further subversion. This is one of three such works, this one incorporating the realization of flesh experiments by artists Eduardo Kac and Stelarc as détournements of the body fused into the original proposer's (Debord's) body itself. This is where subject meets subject meets subject as Additivist object/'crapject' as the metaphorical successes of the previous material becomes a wholly realized pastiche body, waiting for further morphological transformation. The Debord Detourne is the realization of flesh's desire for #Additivism, born in this first iteration in the printer.

Salvatore Iaconesi's Glioma (relic)



In many ways the Glioma is an Additivist relic. Taken from the big data outsourcing project of Salvatore Iaconesi's brain tumor, 'Mi Cura', the glioma is one of a number of reconstructions made from MRI Scans. What makes this one special is that it is constructed of the last data before Iaconesi's tumor removal. 3D printing has allowed amateur tissue modelling, architectural scanning and pancake personalization. Following from the call for icons, relics, and artifacts, the glioma is a data.relic signifying an altology (other than a pathology) signifying the removal, alteration, and realization of the body outside the flesh. It is aN epistemic loop; flesh to data back to material once more, and it could be such a long leap to 3D print with tissue, thus re-imagining the glioma as a 'new organ', depending on the tissue used.

Andrew Blanton
Author

Perception
Project

2016
Year

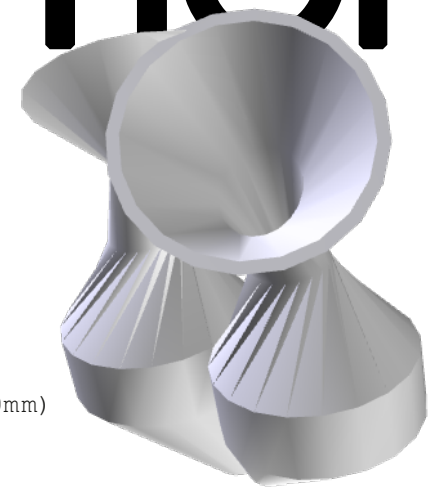
#recipe
Format

#sense
Theme

#extrude
Action

Amplification of subharmonic and harmonic sound through 3D printed structures to extend human perception

PERCEPTION



Ingredients:

1. Perception.obj model (printed width of 20mm to 400mm)
2. 3D printer (preferably metal or ceramic)
3. Ultrasonic sound

Additive processes can be used to alter and expand human perception. Working with Helmholtz chambers that resonate at particular frequencies, additive processes will allow for the construction of new types of structures that can expand the typical human range of hearing or seeing through amplification and filtering processes. Working with Helmholtz chambers, harmonic and subharmonic frequencies can be amplified to be audible by humans. This project will 3D print a structure that can be held up to your ear and make audible sounds that are typically out of the range of human hearing. It is important to note that because of the acoustic nature of this project you will need to print the objects from hard materials including glass, ceramic or metal to produce the best acoustic results.

To create this work, simply print the perception.obj model in ceramic. Once the object is created play a tone with the software and move the number in-between 16,000 and 20,000 to find the resonance of the model, while listening to the small opening of the structure. When you find the right frequency, you should be able to hear the subharmonic frequency.

Additive processes are opening up new potentials for the manufacturing of complex structures that have previously been impossible to create. The internal structure of this chamber naturally amplifies frequencies dependent on the size of the print. With the typical human frequency range constrained to 20Hz to 20kHz resonant chambers allow for the filtering and amplification of harmonics of tones outside of human perception making ultrasonic frequencies audible. By placing this structure up to your ear you will be able to hear naturally amplified harmonics and subharmonics of pitches effectively scaling natural sounds that are all around us but are not perceivable through human ears.

Sound travels in waves, of which Joseph Fourier famously proved that they are made up of sums of simpler sound waves, or what we know as harmonics. Resonant bodies such as Helmholtz chambers will resonate with specific frequencies and because sound travels in waves, can form harmonic three-dimensional structures that can be acoustically amplified. Additive processes are for the first time making it possible to build structures that were too physically complex to be manufactured in any other way. Additive processes position humanity on a new frontier in the creation of hybridized digital and analogue physical structures that can augment our perception of reality, forming new prosthetics and extensions of the human form.

WHAT WOULD AN ADDITIVIST LITERATURE BE?

“ADDITIVIST LITERARY WORKS WOULD FUNCTION BY ‘BUILDING UP PERCEIVABLE REALITY’ IN THE REALM OF ‘PROPENSITIES’, ‘ADJACENT POSSIBILES’ OR ‘POTENTIALITIES’.”

In 1975, Ulises Carrión published *The New Art of Making Books:* a famous theoretical text for contextualizing, conceptualizing, defining and exploring books as art forms. According to Carrión:

> In the old art the writer writes texts. In the new art the writer makes books. To make a book is to actualize its ideal space-time sequence by means of the creation of a parallel sequence of signs, be it linguistic or other.[1]

Deliberately inspired in Ulises Carrión's work on books, artists Luigi Amato and Roberto Arista published in 2014 *VOLUME/A5* – A 'bookwork' that *focuses on the design features of a book as tech as opposed to the content the medium conventionally delivers* [2]. This particular feature makes it an extremely interesting endeavor: The 'authors/publishers' intention was not to print a text, but to print a 3D object by following strict 'code' instructions. The original Carrión's text performs there as a piece of software that's run by Amato & Arista to produce a physical artifact that does neither re-present nor brings to closure the program that originally made it possible. By excluding conventional text, *VOLUME/A5* is able to properly re-present the technical/perceptual conditions of reading itself, their possibilities and their limits – In the artists' own words:

> This publication inquiries the book as an autonomous and self-sufficient medium, a volume in the space in which the physical aspects (dimensions, weight, page numbers, sequentiality and so on) and the modes of fruition become the content of the book itself. Through a script, it has been possible to measure the single page properties and the relation between multiple pages along the space-time sequence of the book. The data made visible by VOLUME show the continuous physical and perceptive variations acting in/on the book during the reading process.[2]

The technical process developed from Carrión's original text to VOLUME/A5 works as a material metaphor of how an additivist literature might look – and function – , but there are many other examples of literary work elaborated by following diverse aesthetic principles and by using different production techniques: Also in 2014, American writer Dennis Cooper published online a horror novel (*Zac's Haunted House*)[3] entirely composed of animated GIFs -I would say the first major literary work using exclusively this medium, although interesting GIF-based works abound in several online platforms such as Newhive. And, certainly, Christian Bok's project *Xenotext* [4], in which the poem is a xenoprotein expressed by genetically modified bacteria, is one of the most significant approaches to what it could be understood an 'additivist literature'. Other works and poetic strategies could be also listed as additivist would be asemic books such as Luigi *Serafini's Codex Seraphinianus,* creative remixes/rewritings such as most Kathy Acker's fiction, Mark Amerika's *Locus Solus* or Christopher Higgs' ***One***, quantum fiction works such as Amy Catanzano's *Starlight in Two Million,* and the results of postdigital experimentation, among which Amaranth Borsuk's *Between Page and Screen* is one of the most outstanding examples. Between Page and Screen is probably the best exploration of the 'bookspace' created thus far. Its pages, like the pages in *VOLUME/A5,* contain no text – only abstract geometric patterns and a web address leading to a website where the book may be read using a webcam and a standard web browser. The poems that appear as consequence of the book/web interaction do not exist on either page or screen, but in the augmented space between them opened up by the reader.[5]

My proposal of an additivist literature would call for an understanding of contemporary writing not just as text production or text managing, but as the development of performative (often self-performing) infrastructures, and as a collective work aimed to the creation of new MEDIA for enriching current MEDIA ECOLOGIES by constructing different kinds of speculative WRITING MACHINES [6]. Contemporary literature would then not just be concerned with the production of more or less complex assemblages of textual and audio-visual signs, but also with providing the material means for diagrammatic – human and non-human – experience through abstract machine[7] – Including digital code, biological code, network development, hardware, etc. – that are not just meant to be 'read', 'understood', or 'criticized' [8], and that very often will act as self-performing entities – or 'autonomous vehicles' – without direct authorial control of what the works really do [9].

1 Carrión, Ulises (1975) The New Art of Making Books
2 prosthetickknowledge.tumblr.com/post/104936906061/volume-a5-art-project-by-luigi-amato-and
3 Cooper, Dennis (2014) Zac's Haunted House
4 Bok, Christian. The Xenotext Experiment
5 Borsuk, Amaranth (2012) Between Page and Screen
6 Hayles, N. Katherine (2002) *Writing Machines.* Cambridge: The MIT Press.
7 Deleuze, Gilles and Guattari, Felix (1987) *A Thousand Plateaus.* University of Minessotta Press.
8 As Kenneth Goldsmith states: 'You really don't need to read my books to get the idea of what they're like' (Being Boring)
9 Catanzano, Amy. (2014) *Starlight in Two Million*, Noemi Press. Catanzano explains that her project consists in 'to intentionally and/or unintetionally engage in a narrative mode within or beyond the fourth dimension might be to read, write or construct texts outside of time, or in all times, making nonlinearity and simultaneity points of view and spacetime a literary device' (p. 98.)

However, alongside technological approaches, literary #additivism could be also understood as an attitude. Confronted with the currently pervasive mythologies of the end, innovative fiction writers are often choosing to be either 'uncreative' or 'feed forwarding' – following the attitude of all-time avant-gardists and experimentalists, and digging deep into unknown realms of expression. The main difference between 20th and 21st centuries avant-garde work is probably that 20th century avant-gardists saw themselves as engineering the future in a progressional and linear time arrow, while present avant-gardists are – individually and collectively– trying to feed-forward into an unpredictable near future by tinkering with the presently available materials. Classical literature was trying to understand the human, modern literature was trying to construct the human, and contemporary literature is trying to synthetize bits of parallel worlds to prevent (or sometimes to induce) the collapse of the world.

Most 20th century experimentalists were already feeling that, as it happened with music and the visual arts, reproduction technologies had set literature free to further experiment with language – It is difficult to imagine a more authentic additivist attitude in narrative than James Joyce's writing *Finnegan's Wake*. The language-intensive writers of today may use technologies as a tool (as in Darby Larson's Irritant or Penny Goring's techno-visual poetry) or as framework (Jan Ramjerdi's *Re.La.Vir*, Kenji Siratori's post-cyberpunk novels), but it is their feed-forward attitude and their deep experimentation aims what better defines their work (recent books by Blake Butler, Lidia Yuknavitch, Johannes Goransson, Joyelle McSweeney, Sean Kilpatrick, Kim Hyesoon, Lily Hoang, Bhanu Kapil and Mike Kitchell, to name just a few, would be a good example of this deep experimentation attitude).

In his recent essay *'Feed-Forward: On the Future of Twenty-First-Century Media',* Mark Hansen explains that, 'twenty-first century media open a new, properly post-phenomenological and non-prosthetic phase of technical distribution in which human experience become implicated in the larger, environmental processes to which they belong but to which they have no direct access via consciousness' [10]. Aesthetic and political responses to this new media condition include conceptualist and experimetalist literary strategies that, even though they'd been often pictured as opposite, compose the synchronic strata of the contemporary literary landscape, and they are better understood as complementary phenomena.[11]

Johannes Goransson has been criticizing American conceptialist poetry on the basis that:

> …conceptualism draws some of its strength from the fact that our industrial-capitalist culture had turned ALL poetry into kitsch. So by proclaiming themselves 'uncreative' or not poetry, they are benefitting from this state of affairs. But what makes kitsch interesting is that decay is not the end of poetry; poetry is often most beautiful or interesting in a state of decay, a state of contamination.[12]

'Uncreative', for conceptualists like Kenneth Goldsmith, means, among other things, non-authorial, and declared non-authorialism collides with a conventional understanding of literary work based on identity politics. Non-authorial, however, does not mean non-performative or non-political. Although Goldsmith himself declares to have embraced Douglas Huebler declaration – '*The world is full of objects, more or less interesting; I do not wish to add any more.*' – , re-writing it as 'The world is full of texts, more or less interesting; I do not wish to add any more' [8], most of his work, such as re-typing texts or 'printing the internet' does add new objects to the world – even though not new 'content'. Furthermore, even for the most 'authorialist' contemporary writers – those writing self-fiction and autobiographical texts – identity is not a fixed 'natural' thing anymore. For these writers, producing serial contingent identities on the internet – functioning as 'abstract writing machines' – is one of the basic strategies of their work [13]. Both conceptualists and experimentalists are indeed adding new layers of reality through their speculative practice. The world is full of objects, more or less interesting; *They add many more, willing or not.*

Many defenders of identity literature erroneously identify 'non-authorial' with 'non-substractive'. Not creating would thus mean not extracting from nature – and nature, as literary criticism has been trying to overcome the modern separation between nature and artifice described by Bruno Latour, includes all the current state of the universe. 'Nature' would represent everything that has been written, built, composed… Nature would be the past belonging to the human memory, just like the 'natural' earth temperature is supposed to be the one we can calculate immediately

10 Hansen, Mark B.N. (2015) ***Feed-Forward: On the Future of Twenty-First-Century Media.*** University of Chicago Press. Kindle 1528

11 Place, Vanessa and Fitterman, Robert. (2014) ***Notes on Conceptualisms.*** Ugly Duckling Press.

12 Goransson, Johannes. Flowers of Kitsch: on Pound, New Critics and Conceptualisms

13 Laboria Cuboniks. Xenofeminism. A Politics for Alienation*:* 'We are adamantly synthetic, unsatisfied by analysis alone. XF urges constructive oscillation between description and prescription to mobilize the recursive potential of contemporary technologies upon gender, sexuality and disparities of power.'

'before artifice'. Just like ecosystems are commonly conceptualized to be 'naturally' fine until human action started to be a significant force. Just like the Anthropocene starts coincidentally with the vanishing of the 'Anthroposcene'. So we feel we've inherited the ruins of a civilization, and everything was meant to be perfect as long as we kept playing zero-sum games, and it will continue this way is we just renounce to build something new with the debris. It's not coincidental that several emerging intellectual endeavours are currently being labeled as 'archeologies' of the present: We live in an era of neo-classification and we have been trained to believe in statistical causality. Recent scientific debates – on global warming, artificial intelligence or gene editing – are centered in the desirerability to slow down research and technology to avoid probabilistically calculated risks. So, to be nice, we should just re-purpose, re-locate on a defined space-time with pre-stablished boundaries. We should just take what's around, copy it, move it to a different context, avoiding any attempt to make anything new. We should understand literature as a terminal art – The End of Literature and/or The Literature of the End –[14].

However, as Graham Harman writes, *nature is not natural and it can never be naturalized*...[15] Additivist fictioneers and theorists are here to go on de-naturalizing[16].

In a recent essay[17], I define 'surface media' as the space where the infosphere is being produced. Following Whitehead, Hansen notes that human consciousness is not central, and faced with the reality that we are implicated in processes that we neither control, directly enjoy, or even have access to, we humans cannot but come to appreciate our participation in a cosmology of processes, which is to say, to embrace our superjective implication in a plethora of processes of all sorts and all scales[18]. Humans are, in fact, 'emitting' the infosphere in a similar way cyanobacteria produced the biosphere 2.3 billion years ago, and – while science explores the infosphere – speculaive fictions are exploring the adjacent possible of the infosphere – or, at least, the hypothetical territories belonging to a human cognitive morphospace that is not strictly 'human' anymore[19]. Additivist literary works would be best represented as speculative 'poe-theory-fictions' – enactions of reality that have been mediated via human/nonhuman intervention to adapt to the human cognitive morphospace –: computer-generated art (including texts, images, sound, 3D objects, digital currencies, market automation, etc…), bio-literature ('written' on biological code), and many post-digital artifacts including, of course, a wide range of printed books. Additivist literary works would function by 'building up perceivable reality' in the realm of 'propensities', 'adjacent possibles' or 'potentialities'[20].

Digital technology does not just change the way new narratives are being produced and received: It reshapes, at the same time, the techno-cultural representations of reality, thus radically re-mediating our experience of the world. It seems now evident that digital technology has 'return-of-the-real' effects expanding well beyond representation:

> Technology affects our experience first and foremost through its infrastructural role, its impact occurs prior and independently of our production of representations: effectively, technologies structure our lifeworlds and influence our embodied lives at a level, as it were, below the 'threshold' of representation itself.[21]

Fictions produced in this context could be, thus, understood as the reflection of a complex physical network (actor-networks) comprised by electronic

14 Sierra, Germán. (2016) ***La literatura del fin.*** In: 'Narrativas Cruzadas. Hibridación, transmedialidad y performatividad en las Humanidades Digitales' (Ed. by Teresa Vilariño Picos). Academia del Hispanismo. In press.

15 Harman, Graham (2005) ***Guerrilla Metaphysics,*** Open Court. p 251.

16 Laboria Cuboniks. ***Ibid:*** 'Our lot is cast with technoscience, where nothing is so sacred that it cannot be reengineered and transformed so as to widen our aperture of freedom, extending to gender and the human. To say that nothing is sacred, that nothing is transcendent or protected from the will to know, to tinker and to hack, is to say that nothing is supernatural. 'Nature' – understood here, as the unbounded arena of science – is all there is. And so, in tearing down melancholy and illusion; the unambitious and the non-scaleable; the libidinized puritanism of certain online cultures, and Nature as an un-remakeable given, we find that our normative anti-naturalism has pushed us towards an unflinching ontological naturalism. There is nothing, we claim, that cannot be studied scientifically and manipulated technologically'

17 Sierra, Germán. Deep Media Fiction. Numéro Cincq, Vol. VII, No. 1, January 2016

18 Hansen, Mark B. N. ***Ibid,*** Kindle 466

19 Hansen, Mark B. N. ***Ibid*** : 'Experience can no longer be restricted to – or reserved for – a special class of being, but must be generalized so as to capture a vast domain of events, including everything that happens when machines interact with other machines in today's complex media networks, everything that happens when humans interface with these networks, and also, of course, everything that happens when humans self-reflect on these interactions. Put another way, the scope of experience must be broadened to encompass not simply what it has always encompassed – higher-order modes of experience and lower-order, bodily modes to the extent these bubble up into higher-order ones – but a veritable plurality of multi-scalar instances of experience that extend, along the continuum of what Whitehead calls 'causal efficacy', from consciousness all the way down to the most rudimentary aspects of our living operationality and all the way out to the most diffuse environmental dimensions of a given sensory situation' (Kindle 990)
'Technical distribution now involves an expansion of experience that literally exceeds the resources of human perception, it is not longer possible to reference experience exclusively on the higher-order faculties that have long been associated with the human. This means that we must renounce the position of mastery we have long accorded ourselves and instead take our place within the larger environment networks of sensibility that generate experience' (Kindle 1427).

20 Hansen, Mark B. N. ***Ibid,*** Kindle 694

21 Hansen, Mark B. N. (2000) ***Embodying Technesis: Technology Beyond Writing.*** University of Michigan Press. p 4.

and non-electronic objects and interactions in an universe characterized as 'potentiality.'[22] After the deconstructionist efforts of postmodernism, a new wave of rationalist, conceptualist and constructivist poetics are emerging, impulsed and inspired not just by the new media, but specially by the new set of personal and aesthetic relationships produced by interaction through digital communication technologies[23]. Commenting on Nick Land's and Sadie Plant's accelerationism, Mackay and Avanessian explain that:

> …at the dawn of the emergence of the global digital technology network, some authors, rediscovering and reinterpreting the work of the latter, develop it into an antihumanist anastrophism; while postmodernism can do no more than mourn this miscognition, accelerationism now gleefully explores what is escaping from human civilization, viewing modernity as an 'anastrophic' collapse into the future.[24]

Digital tools, services and communities blend with analog ways of life, so readers are ready and willing for the 'real' and the 'virtual' to co-mingle in a seamless way. While 'text' used to be a central concept for postmodernist thinkers, 'code' became the central concept for digital fiction writers. 'Code' emerged as a new, universal, performative language, unifying written and audiovisual arts within its 'textual nature' to the point that writers could become designers while painters and musicians started to 'write' their works in code. While deconstructionist theory questioned the stability of language's meaning, the current conditions, both online and offline, are presenting us words as physically destabilized entities[25]. Images and sounds are, in fact, texts, but, at the same time, everything becomes image: Any website, even if it only contains text, it's also perceived as an image on a screen[26], and any screenshot, if printed on a paper book, can function as a text[27]. The digital literature paradigm shifted from 'text' to 'code', but code is just a particularly privileged form of text. Additivist literature is unmistakably postdigital – meaning it is not centered in code, but in addressing a reality shaped by a mixture of coded/uncoded reality. In a postdigital paradigm, literature is used as a tool to discover 'alternative' messages that emerge in the empirical manifestation of the mediatization processes. As Mark Hansen explains,

> [W]hat remains unprecedent in the history of mixed reality (that is, of experience as such), and what is thus singular about our historicotechnical moment, is precisely the becoming-empirical, the empirical manifestation, of mixed reality as the trascendental-technical, the condition for the empirical as such'[28].

Artistic writing means to challenge current codification by re-coding, focusing on formal qualities as well as comunicative ones, viewing language as, 'a substance that moves and morphs through its various states and digital and textual ecosystems'[29]. As Katherine Hayles writes, 'literature was never only words, never merely immaterial verbal constructions. Literary texts, like us, have bodies, an actually necessitating that their materialities and meanings are deeply interwoven into each other'[30]. By ignoring the sirens' call chanting the end of art, an additivist literature would be, maybe, a collection of poetics and techniques to Frankenstein new bodies.

. . . . . .

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22 Stengers, Isabelle (2011) ***Thinking With Whitehead. A Free and Wild Creation of Concepts.*** Harvard University Press: 'Temporalization is not the unfolding in the course of time of real elements as a function of real elements, it is 'real becoming', and as such requires that the universe also be characterized as 'potentiality'' (p.190)
23 Sierra, Germán (2012) ***Post Digitalism and Contemporary Spanish Fiction.*** Hispanic Issues On Line 9: 22–37
24 Mackay, Robin & Avanessian, Armen. (2014) ***#Accelerate. The Accelerationist Reader Unbanomic.*** p 20.
25 Goldsmith, Kenneth. (2011) ***Uncreative Writing.*** Columbia University Press.
26 Mora, Vicente Luis. (2012) ***El lectoespectador.*** Seix Barral.
27 Dullaart, Constant (2014) 'Balconism.' ***Printed Web No.2.*** Library of the Printed Web.
28 Hansen, Mark B. N. ***Ibid.*** p 20
29 Goldsmith, Kenneth., ***Ibid.*** p 34.
30 Hayles, N. Katherine ***Ibid.*** p 107.

#fabulation
Format

#beyond
Theme

#morph
Action

Bodily transformations that aim at the enhancement of sensory pleasure during oral sex behavior among gay men

THE FELLATIO MODIFICATION PROJECT

'The Fellatio Modification Project' is an application of the biological techniques of dentistry and tissue engineering.[1] In this project, a series of oral transformation is conducted. Via bodily transformations, this project aims at the enhancement of sensory pleasure during oral sex behavior among groups of gay men. The usual purpose of these technological and medical procedures is to cure illness so as to restore a patient's normal physical function; however, this project's aim is to extend oral function through the practice of dental medicine. In the field of dentistry there are three main functions of the oral cavity: aesthetics, pronunciation, and mastication. This project focuses on a forth function: sex, which is left unspoken and undiscussed on the textbooks of dentistry. The physical pleasure of orgasm is never seriously discussed but is constantly practiced and pursued. Specifically, the scope of my project will be narrowed down and focus on gay culture. I want to discuss the interrelations among sex, technology, humans and society during the absolute pursuit of physical pleasure. Also, I herein raise a question about the possible extremes of corporal transformation. My project will be divided into two sections, one is the 'Male Masturbation Cup Mouth', and the other is the 'Bird Beak Clone'.

1 Tissue engineering, also known as 'regenerative medicine', is the cultivation of a biologically active substance in vitro, so that the culture can be used to reconstruct or repair tissues or organs.

THE MALE MASTURBATION CUP MOUTH

The idea of this section is inspired by the design of the sex toy for male masturbation. The main concern of the design is to enhance the intensity of the orgasm generated by the contact between the penis and concave-convex surface inside the masturbation cup. In this sense, the texture of the surface inside the cup is crucial. Referring to the design of the internal layer of the masturbation cup, the oral transformation in this section adapts the surface of the oral mucosa through dental techniques. This surface modification of the mouth mucosa is made up of bulges and bilges designed to trigger orgasm; an extension of the design of the male masturbation cup. This section will be divided into three stages.

In STAGE ONE, I adapt the form of the retainer (fig. 1) for patients undergoing orthodontic therapy. By the side of the palate of the device the bulge-bilge surface design is applied with a layer of soft denture reline materials. (fig. 2) Because it is designed to imitate soft tissue this ingredient was specifically chosen to generate a much more intensive orgasm for gay couples wearing this device during oral sex. (fig. 3 & 4) The technique of tissue engineering is conducted in the second stage. (fig. 5) Here, I replace the soft denture reline materials with real cells. In this condition the texture of bulges and bilges is almost the same as the body.

Fig. 5 is a flow diagram of the cultivation of the tissue. From the chart we can see cultivation begins by obtaining human cells (see the 'cell from biopsy' in fig. 5). These cells grow in the petri dish. Along with the button of the dish the monolayer of cells are expected in this process. The third step is to expand the cells into several monolayer cultures. The transplantation of the cell cultures from the dish onto the 3D scaffold follows the former process, so that the cell cultures will grow into the composition of the organ as expected (see 'Culture on a 3D Polymeric Scaffold ' in fig. 5). As a result the cultivated organ will be transplanted onto the body to perform its function (see 'Generation of a Graft' in fig. 5). Following the flow in fig. 5 I want to produce a retainer like the framework so as to grow cell cultures onto it. In this condition, the cells will substitute the soft denture reline materials.

In STAGE TWO, I worked with Professor Lin, Yuan-Ming 's tissue engineering lab in the National Yang-Ming University in Taipei, Taiwan.[2] There are three major concerns in Prof. Lin's lab: tissue engineering, biological material, and regenerative medicine. The process of tissue cultivation is illustrated in fig. 5. The 3D framework of the organ is supposed to be constructed with the ingredients beforehand. Afterwards cells will be placed onto the framework and then placed in the incubator for cultivation. After a discussion with Professor Lin I decided to adopt osteosarcoma cells MG-63 as the ingredients of the primary experiment, due to the fact that cancer cells are much easier to grow than the stem cells. Furthermore, the framework will be composed of silica gel by leaching salt.

The polymer solution which is added with the catalyst beforehand is blended with the salt porogen. Owing to the chemical reaction caused by the catalyst the polymer solution will be solidified. Spontaneous with the solidification the solid silica gel will encapsulate lots of the salt porogen. Then, as the process continues water is blended with the silica gel. In this condition, the salt porogen will be separated out, a.k.a porogen leaching. There are lots of holes left by leaching salt porogen inside the rest of the silica gel framework, which is a porous structure. According to these processes I produce a sample of the framework, which is about the size of 1 cm x 1 cm x 2 cm. Inside the framework leaching salt causes holes to form, within which cells can grow.

The next step is to place the MG-63 onto the framework for cultivation. After about a week of cultivation the pigmentation is adopted to observe the stability of the growth of the cells. This shows the possibility of producing the ingredients of this experiment. The observed green particles are living cells; by contrast, the red ones are dead. From observation we can know the green ones outnumber the red;

STAGE ONE

Modify the orthodontic retainer that would be worn by patients by covering the upper palate of the retainer with soft denture reline material, which emulates real soft tissue, to create an embossed surface. During oral sex, the back and forth contacts with the raised surface would enhance physical pleasure.

STAGE TWO

To enable the raised surface of the orthodontic retainer to have a closer resemblance to actual oral tissues I replace the soft denture reline material with tissues constructed from tissue-engineering technology.

STAGE THREE

I no longer use an orthodontic retainer as a tool to enhance the pleasure from oral sex. Instead, I will surgically implant real embossed soft tissue constructed by engineering technology on the upper palate of the patient, thus creating a permanent modification to the oral cavity structure.

2 **Professor Lin is now the faculty of the Department of the Dentistry in the National Yang-MingUniversity in Taipei, Taiwan.**

Fig. 1

Fig. 2

Fig. 3

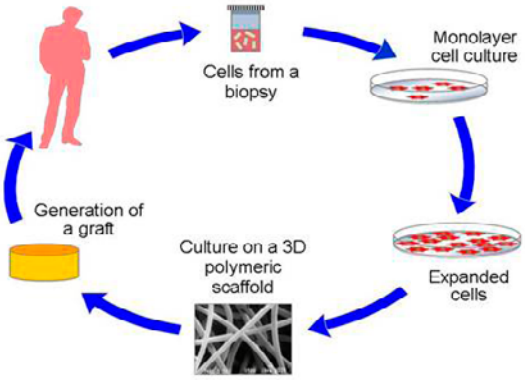


Fig. 5

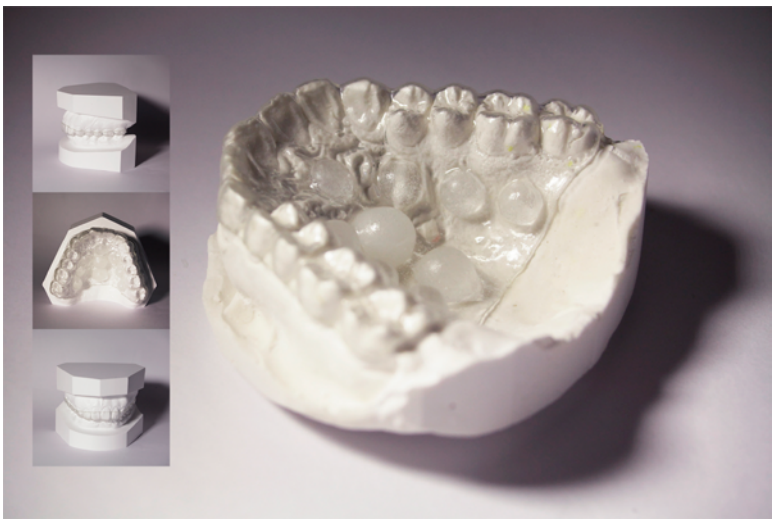


Fig. 4

therefore, we can from this experiment claim that this framework sample suits the growth of MG-63. Following the success of the aforementioned sample, the framework of the retainer will be further discussed.

From scientific research to artistic innovation I start to imagine further possibilities, for the cells that do not completely grow on the framework. The following paragraphs explore these imagined possibilities. In an ideal situation the soft denture reline materials on the retainer of the first stage can be replaced with the silica-gel porous structure and also build up the construction of bulges and bilges. I shot a video to demonstrate the imaginary scene of the procedure of the experiment to cultivate cells as technological progress meets the level of what this experiment requires. Fig. 6 & 7 are clips form the video. In fig. 6 foetal bovine serum is placed in the petri dish (a nutrition source to cultivate cells). The white retainer in the dish is the framework of cells. The framework bears no cell though during the shooting, yet I still follow the procedure of cell cultivation: I put the framework into the heat-control incubator in the video. In this imaginative situation, I hope tissue grows on the framework. The texture of the cultivated concave-convex form will be much closer to real flesh than of the inorganic polymer solution. In this condition, during oral sex, the cultivated tissue will generate much more intensive orgasms.

In STAGE THREE a retainer is no necessary to invoke the bulge-bilge form design. Instead, the cultivated soft tissue of the form design will be directly stitched up on the surface of the palate, which is synonymous with the permanent adaption and reconstruction of the human body via surgery (see fig. 8). Fig. 8 shows the oral and maxillary flap operation in periodontal therapy. Via surgery the soft tissue of oral cavity will be peeled back so as to stitch up the cultivated concave-convex soft tissue. After surgery the oral construction of the human body is forever transformed (see fig. 9). The transformed oral mucosa then is forever appropriate for oral sex. This stage of surgery cannot yet be fully performed, making this part of the project an extension of my scientific fantasy.

The first stage can be thought of as an innovative form of sex toy. The following stage pushes the project into the realm of the biological sciences through the use of real human tissue. In the final stage direct surgical transformation is undertaken, resulting in a permanent alteration of the body. In my plan the development of these three stages is not progressive but optional, which means users can make the choice how far along the transformative process they are willing to go.

BIRD BEAK CLONE

Among gay men the orgasm resulting from swallowing the whole penis during the oral sex is a common pursuit. However, the bulk of the oral cavity is limited. In this case some people find it difficult to swallow the larger size of penis, for this action can result in the spontaneous gag reflex as the penis touches the pharynx and the larynx. Therefore, the transformation goal in this section is to increase the volume of the oral cavity by lengthening it via surgery. As a result, the gag reaction will not occur during oral sex, since the bulk is enough for the penis. Furthermore, an enhanced intensity of orgasm can be expected since the penis can be fully swallowed.

The orthognathic techniques in this section are adopted from the field of oral and maxillofacial surgery which aims at the transformation of bone structure. Fig. 10 is an illustration of orthognathic surgery. In the upper left of fig. 10 we can see the patient suffering from hypermorphosis of the mandible; on the contrary, the upper right depicts a patient whose lower jaw has failed to grow. Receiving orthognathic surgery the mandible is moved along with the direction of the arrow. The lower jaw of the patient on the lower left is moved backwards; the lower right forwards. Fig. 10 not only illustrates the bone constructions undertaken during surgery, but also photographs of the patients.

There are many sorts of surgical treatment associated with orthognathic surgery. In this section, the Le Fort I osteotomy[3] is adopted as the upper jaw is cut and drawn forwards (see fig. 11). For the lower jaw the adopted technique is known as bilateral sagittal splitting osteotomy[4] (see fig. 12). After the surgery the mandible will be dragged forwards as well. This is the process of the Le Fort I osteotomy. In fig. 12 we can see both sides of the lower jaw are split. Following this, the entire lower jaw is moved forward. This is the process of bilateral sagittal splitting osteotomy. After undergoing either of these surgical treatments the split bone will be stabilized by pins and forum, allowing the bone to gradually grow into the new position. Accordingly, the upper and lower jaw spontaneously move forwards, a pathological condition called bimaxillary protrusion.[5]

Owing to legal limitations this experiment cannot be taken to clinical trial. Therefore, I adopt model surgery

3 Le Fort I osteotomy is a form of orthodontic surgery. The treatment is to cut the alveolar process of maxilla, then fix it in place by pin. The purpose of this surgery is to shorten the midface, move the upper jaw forwards, or to the right or left.

4 Bilateral sagittal splitting osteotomy is a form of orthodontic surgery. The treatment is to sagittally split the ramus of the mandible to adjust the position, then fix it in place by the titanium alloy pin. The purpose of this surgery is to move the lower jaw forwards, or to the right or left.

5 Bimaxillary protrusion is a pathological term, which means protrusive and proclined upper and lower incisors and an increased procumbency of the lips. In this condition patients cannot close their lips and tend to expose their gums while laughing. Their lips look thicker; comparatively, their chin looks smaller. On top of this, as patients try to cover their front teeth intentionally their chin will appear even smaller

Fig. 8

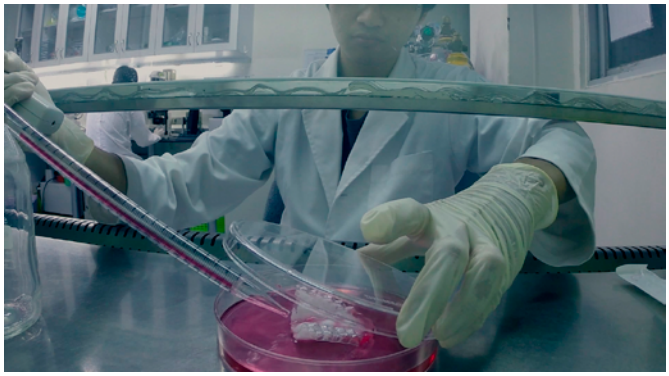


Fig. 6

Fig. 7

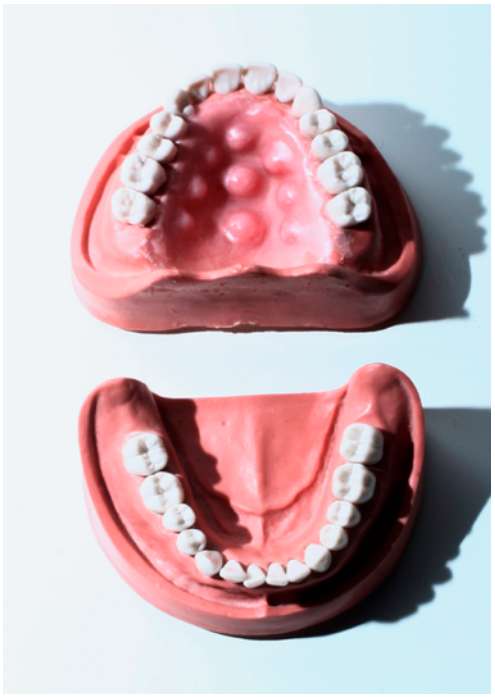


Fig. 9

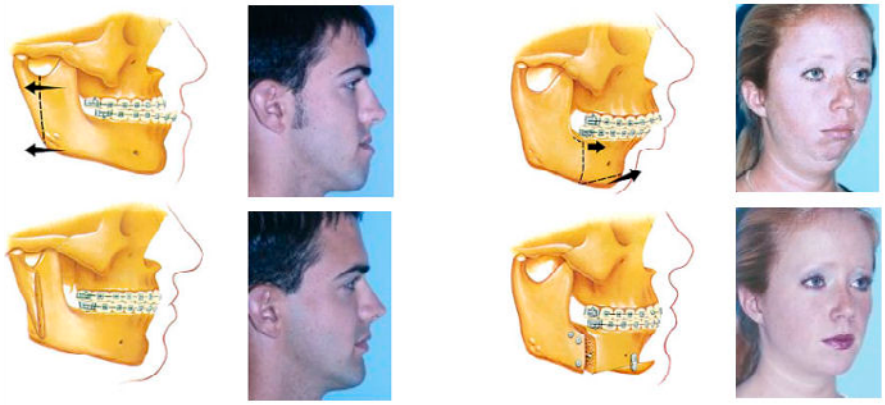


Fig. 10

and perform this new surgical treatment design on the model. At first, I take the computed tomography[6] to get an image of the skull (see fig. 13). From fig. 13, we can observe each gray-scale image is a 2D section from three different aspects. The upper left is the transverse section, the upper right the longitudinal, and the lower right the sagittal. Based on these three images of the three different sections we can construct the 3D model of skull in the computer (see fig. 14). The red part of the lower left image in the fig. 13 is the 3D model of the mandible bone, and the comparative position in each of the other gray-scale images is marked in red. The image to the left in fig. 19 is the 3D structure of the entire skull. From the image to the right, we can see the two cutting lines, which marks the surgical cutting position of the maxilla and mandible respectively. To highlight, the cutting position is predicted by the adoption of the 3D model. As the cutting line is marked, the simulated operation can be performed in the computer (see fig. 15). In fig. 15 the comparative position of the bone before/after the surgery can be observed: the image to the left illustrates the bone position before the surgery. As we can see, the upper jaw is cut into two parts in blue and in green by Le Fort I osteotomy, the lower in yellow and blue by bilateral sagittal splitting osteotomy. From the image to the left, we can see the bone position after the surgery: the blue part of maxilla and the red of the mandible are moved forwards and lengthened. In addition to the simulated surgery in the computer, we may adopt 3D printing methods[7] to print out a 3D model of the skull. Therefore the model of skull can be corporeally cut, which help to evaluate the possibility of the surgery. Fig. 16 & 17 illustrate how the 3D model is corporeally cut. Thus, we can observe the details of the comparative position of the surgery in space.

Conclusions

Comparing the Male Masturbation Cup to the Bird Beak Clone, the key difference lies in the obvious change of the appearance after transformation of the body. To some extent, this change of the appearance would mark out the sex hobby of the surgery recipient, which may then affect the relation between this person and society. Extending the implications of this project into a speculative future, this surgical technique could be widely adopted among a specific group of gay men who find fascination in oral sex with larger penises. Among this group, gay men may take the surgery to make their oral cavity able to contain a larger size of penis. Under these conditions the obvious change of their appearance will make the beak-like mouth a token of their group. Furthermore, people of this group will be able to distinguish their partners by their specific sexual hobby. The reason why I set up this scientific fantasy of gay cultures is to highlight correspondences in present day gay subcultures, especially the Castro Clone.

Originating in 1970s San Francisco, the Castro Clone is a classic example of a group of gay people known for a specific appearance. As the gay liberation movement came into focus this group of people dressed themselves in the style of blue-collar labor workers as a token of worship for the masculine image. That is to say, this group of gay men fashioned themselves in the same image as the objects of their desire and sexual attraction. As a result, this group of people are called 'clones'.[8] During the 1980s many gay subcultures gradually varied from the Castro Clone, such as the 'Bear' and 'Monkey', in which gay men shared and pursued one specific body image as a token to their own group. In my imagination, Bird Beak Clone is also a gay subcultural group founded on a specific body image: the beak-like mouth as a token. Through my fantasy I want to raise a question as to whether the demonstration of a sex hobby is synonymous with the demonstration of the stigmatization of sex. Can the act of claiming and reifying the sexual hobby be considered a challenge to the fixation and naturalization of sex?

6 Computed Tomography, abbreviated as CT, is to scan the human body by X-rays. The computer then computes a 2D image for the physician to observe the internal part of body. The invention of CT realises the dream that the living organs and the anatomical structure can be observed without cutting the human body, as well as that infections inside the body can be easily seen. Undoubtedly, the invention of CT is a great milestone in the medical field. This technique was first proposed by the British engineer, Housfield, who was also rewarded with the Nºbel Prize in Physiology or Medicine for his invention. The usual application of CT are on the head, the ENT (ear, nose and throat), the thoracic cavity, the abdomen, the pelvic cavity, the spine and the joints. But almost the whole body can be examined by CT.

7 3D printing, a.k.a. Addictive Manufacturing, is one technique of rapid prototyping. Based on a digital model file almost any 3D object can be immediately printed by this technique. Through successive layering of powdered metal, or resin, the kind of adhesive materials used in 3D printing allow for the construction of objects, a so-called 'additive process.' The techniques of 3D printing vary from that of traditional mechanical work, since the latter is usually considered a craft on pre-existing material, through processes of cutting, peeling, or boring. In the past 3D printing was usually applied to mould production in industrial design. Today it is also used to for direct product production, especially valuable products (such as the pelvishipjoint, the tooth, or some accessories of the plane). To produce accessories by 3D printing furthers the popularisation of this technique.

8 Originating in the 1970s Castro Clone is a gay subculture focussed on the worship of masculinity. Members of this subculture, clustered in the Castro distinct of San Francisco, perform a strong, muscular self-image. They always build their physique well at the gym, have their hair cut short, and wear a thick mustache. They also prefer to dress themselves with the look of blue-collar worker.

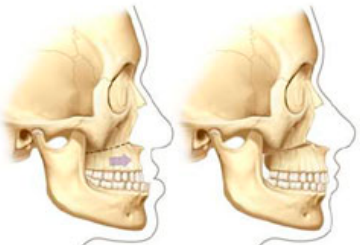


Fig. 11

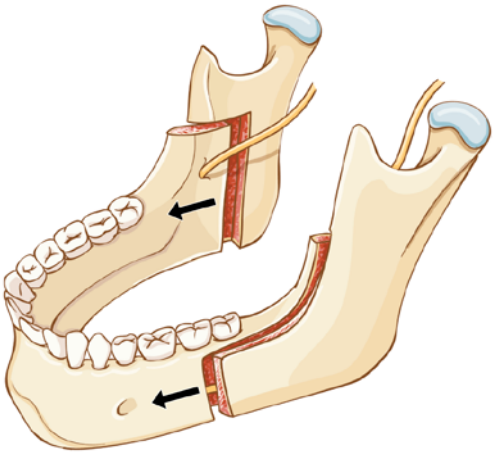


Fig. 12

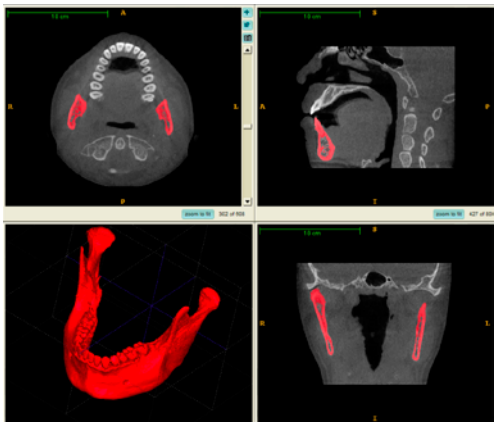


Fig. 13

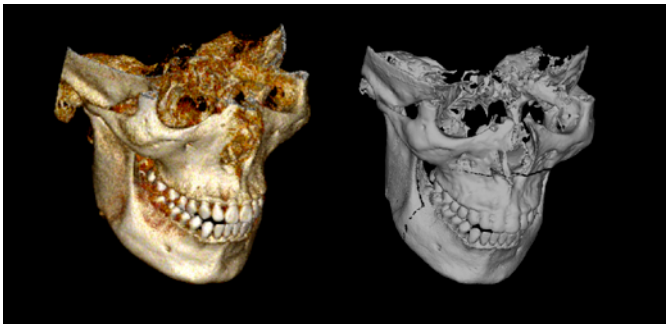


Fig. 14

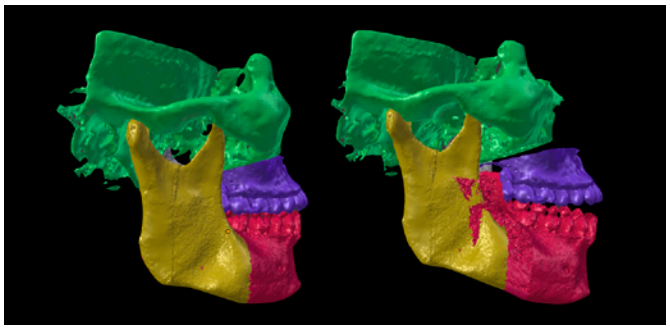


Fig. 15

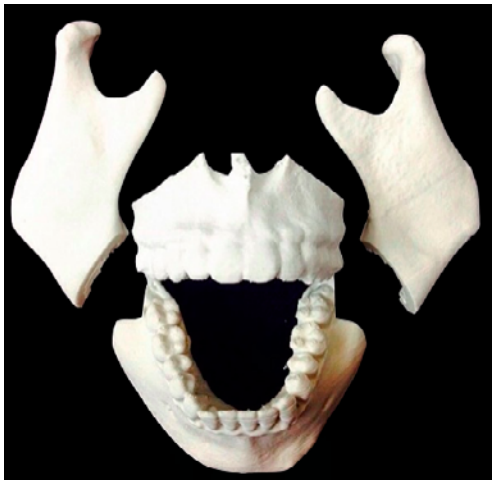


Fig. 16

Fig. 17

Chris Coleman
Author

Fundament(al) 3D Printer
Project

2015-2016
Year

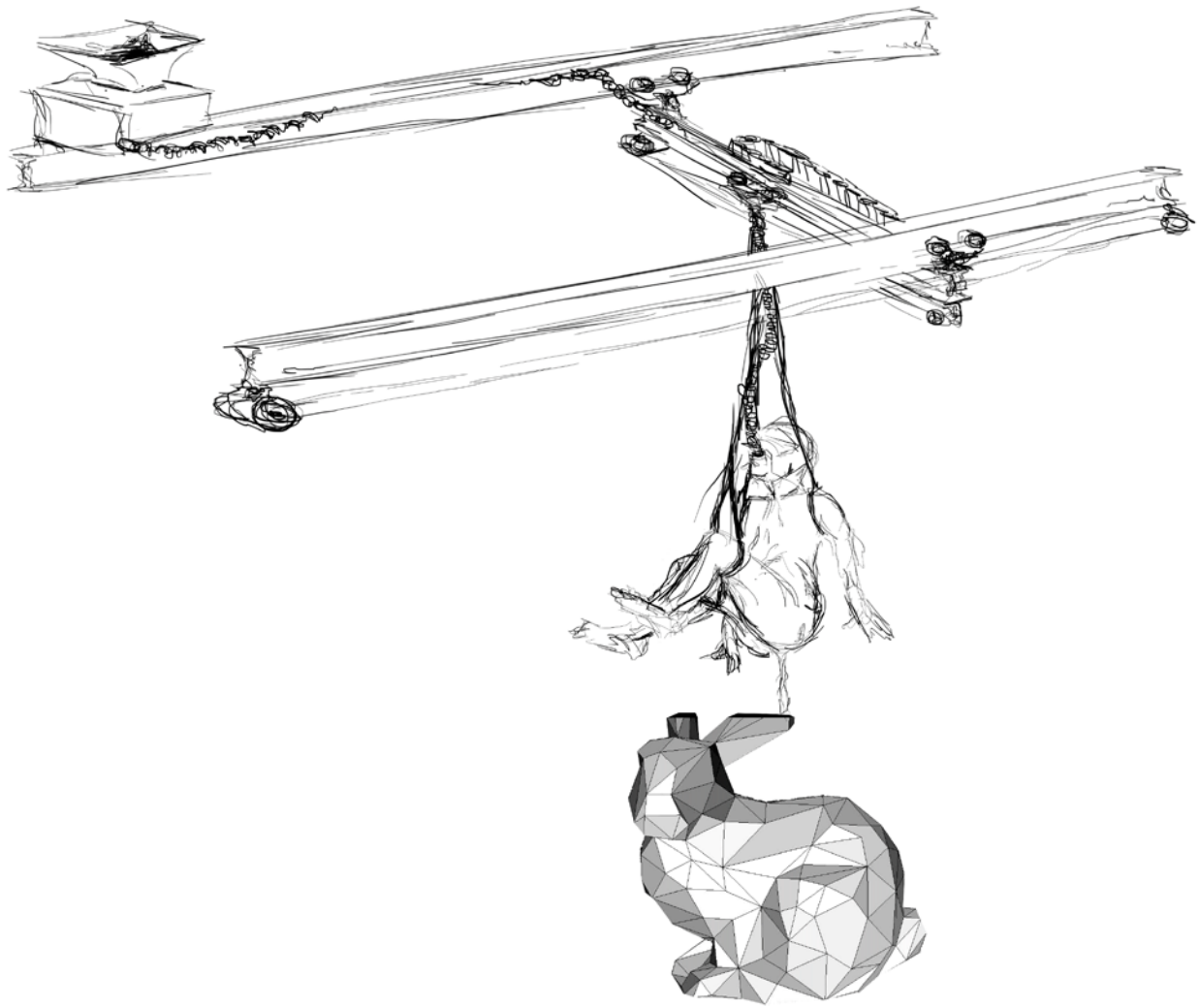
#blueprint
Format

#postnature
Theme

#replace
Action

Method for creating a large scale biological printer

FUNDAMENT(AL) 3D PRINTER

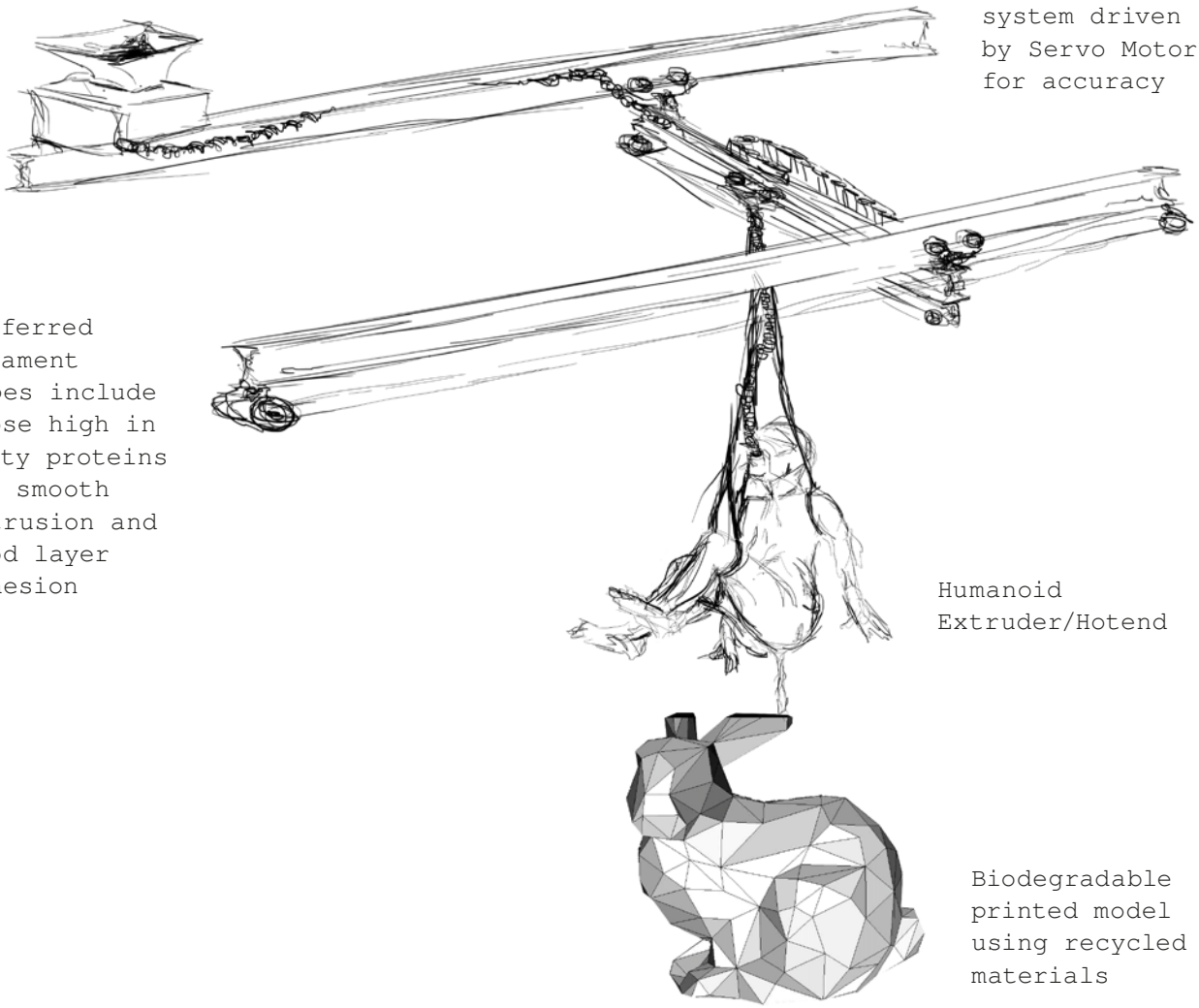


The design for Fundament(al) 3D Printer depicts a method for creating a large scale biological printer. Using a basic shop gantry, a hanging sex sling, some servo motors and a prone subject, one could build a printer capable of a large print volume at a very low cost. One could argue that the printer is using recycled materials to print, but this would be false since the filament is a dual purpose hot end energy source with the waste product becoming the printed material. The benefit is that the printed material is biodegradable or can be sealed with clay for a structural and insulated wall interior, not unlike the dung huts in use around the world.

We often find that we are making machines which replicate functions we can do, perhaps even more efficiently. This project is connected to #Additivism because it is much more human in its approach to dimensional printing, while also being extremely inhumane. How long could I run this type of 'hot end' for the cost of the $300 hot end on eBay, or the multi-thousand dollar one in a high end printer?

Filament Material Bin with pre-mastication system

Overhead Gantry system driven by Servo Motors for accuracy



Preferred Filament types include those high in fatty proteins for smooth extrusion and good layer adhesion

Humanoid Extruder/Hotend

Biodegradable printed model using recycled materials

Large scale BioPrinter

This design for a large scale 3D printing system that reduces energy use and can easily produce prints on the scale of 3m x 3m x 3m. The Hotend should produce prints for 45-60 years, depending on Filament materials. The largest drawback to this system is the extrusion speed, which is limited to 1 m/hr or 17 mm/min with a typical 2-3 cm nozzle. With smaller models the drying/cooling time might require slower speeds until current research into reliable coagulants if completed.

PESTS IN THE ONTOLOGICAL MESH

"IT COULD BE ARGUED THAT WE ARE IN FACT THE MOST EXPANSIVE, DESTRUCTIVE, AND WIDELY NETWORKED PEST SYSTEM THAT EXISTS ON THE PLANET."

Other species arguably mastered additivist technologies before humans ever began to dream up the machines complacently sitting on desktops oozing out techno-colored plastics into the shapes of rabbits and teapots. Long before the Stanford Rabbit and the Utah Teapot were conceived, nature's 3D printers and additivists have been hard at work beneath our feet shifting the dirt on which we stand, in flight just above our heads carrying their own filament behind their legs and in their mandibles, and skimming through the waters to construct complex structures by physically transforming materials from one state to another. For example, leaf cutter ants shift tons of soil to create complex underground systems of interconnected super roads that lead to homes, farms, trash pits, and birthing centers while paper wasps whisk together fiber with their own saliva to form ever evolving nests. Caddisflies vigorously move through rivers all over the world building protective shells from debris that drift along the bottom of their watery worlds. Termites, like ants, display the ultimate ability to construct fully functioning cities that can rise up from the ground like a 3D printed high rise made of dirt.[1]

Over time, these insects have adapted their building styles and structures to evade (and sometimes entice) warfare with other species, some constructing super cities and new methods for living, while all ultimately evolving their building techniques to coincide with the ever changing ecological systems in which they exist to ensure their own collective survival. All of these insects, instinctively and historically have been building structures, one layer at a time, devoid of care for their millimeter height resolution. The aforementioned insects are a very small sampling of what we as humans have determined to be pests. These pests have the ability to collaboratively form cities with governance, organizing labor into class based systems, and distributing resources for the greater survival of the species as whole. Metaphorically there is no denying that human and insect pests can be linked through some of these societal similarities.

The term Pest, as defined by humans reads: 'A destructive insect or animal that attacks crops, food, livestock, and other resources. Informal, an annoying person or thing – a nuisance'. If we apply this criterion to the way that humans devour and reconfigure planetary resources, it could be argued that we are in fact the most expansive, destructive, and widely networked pest system that exists on the planet. Like many species of insects who share information via pheromone systems, humans have developed a hive mind through social networking applications and desktop tools. The Internet has given way to our very own techno-plagued system that allows for the instant sharability of information as well as perpetual connectedness through our now cyborgian-selves with cellular data being passed from our bodies, to satellite, and back down to earth. As pests we have evolutionarily come up with our own systems that allow us to swallow natural resources and re-allocate material through a constant and steadfast digestive appetite for the next best, bigger, faster and more efficient technological innovation.

At one time, additive technologies were only attainable by the highest of powers, engineers who held positions of access in the technological Queen's court. As time has progressed, metaphorical workers (common humans) have gained access to their very own additive desktop tools, thus fundamentally dismantling a branch of the hierarchy of technological infrastructure. While social pest-based insect systems share a common goal of developing their additive structures to protect and build their colony for the common good of the whole, 3D printing technologies have become our human call to creating our own solitary hives. Individualized fabrication and replicability has allowed us to stray from our reliance on certain elements of the hive to create and print our own forms of architecture, body attachments, food sources, speculative experiments for survival, along with mass amounts of plastic junk. Conversely, the hive mind of the Internet drives the sharability of these new forms, technologies, and techniques across cultural boundaries allowing one hive's creations to permeate another.

Humans engaging with these technologies obviously have individual intelligence and decision-making capabilities that do not necessarily tie them to a socialist type regime in the way that insect super organism systems operate. One must consider what the consequences are, if any, of an individualized world where one with access to these technologies can simply press 'print' to bring a digital mesh into the physical world regardless of whether or not the mesh in question benefits a larger group in any way or if it should. Should the human pest be mindful of its steadily growing pool of PLA further aiding in a different form of ecological disruption? Are 3D printers a tool that works towards forming new solutions for our collective survival? Or will these tools be used in/for individualistic dismantling of architectural, biological, and ecological systems

1 ***Collective Mind of the Mound: How Do Termites Build Their Huge Structures*** **by Lisa Margonelli for National Geographic**

and structure? The potential for rupture in our interdependency on the larger hive structure for tangible, fast, and custom approaches to solving DIY solutions needs to be able to support individual departures. The accessibility of additive technologies for humans has created a potential pathway to further individual agency and depart from factory manufacturing through the hive mind of open source digital media. Ultimately as builders we are all partnered as pests in the ever-shifting ontological mesh of technological tools.

RECONFIGURED CREVICES: AN HABITUAL INTERRUPTION

#Additivism presents an opportunity for active engagement with social and community design processes that bring together artists, designers and architects to create something more than we can produce individually. This speculative text or 'call to action' proposes three interconnected and parallel concepts or modes of action:

1 • COMBINE PUBLIC ART & PUBLIC HOUSING using technology to participate in broken systems through intervention and active representation; finding the holes and niches to allow for useful habitats within public spaces.

2 • BUILDING AFFORDABLE SOCIAL ARCHITECTURE using 3D printed component systems combining and facilitating a spatial intervention and disruption by stealth and layering; engaging citizens, including marginalized communities, in the architecture of public space.

3 • PROVOKING COMMUNITY ENGAGEMENT WITH 'DISPOSABLE' ART AND DESIGN CONCEPTS through digital examples of possible architectures and proposed systems.

Public spaces once provided useful transient habitats such as waterfronts, forests, fields, cliffs, caves and large objects with crevices and niches. These spaces still exist within current urban environments but they are poorly utilized and configured. Many of these natural spaces are encroached upon by 'wasted' built environments.

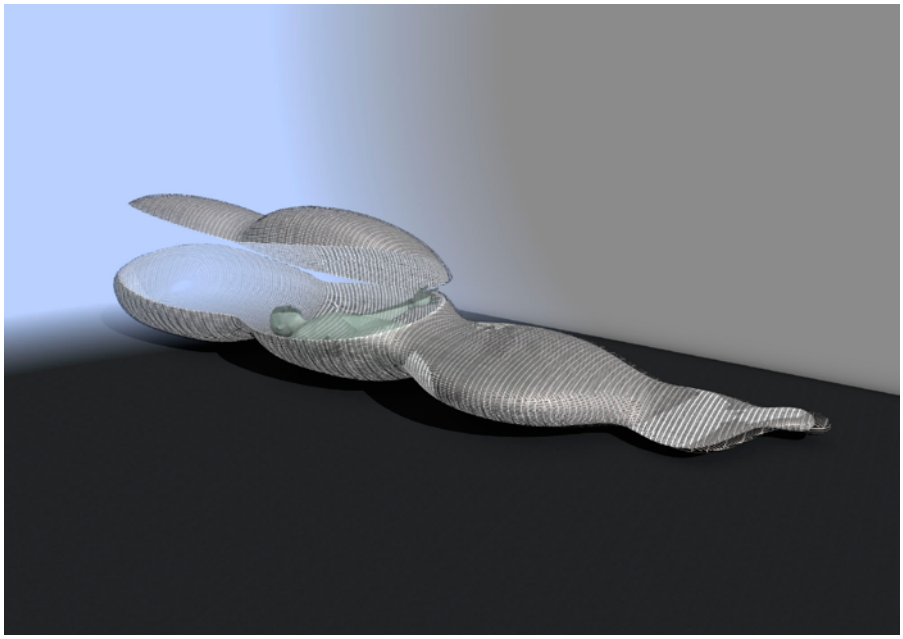
Ephemeral or transient social structures also have well developed histories within the engineering, arts and architectural communities. However, primarily this has involved disparate discussions about parasitic and ephemeral architecture, the planning of public and urban spaces as an after thought, social welfare programs, and affordable and refuge housing for the homeless.

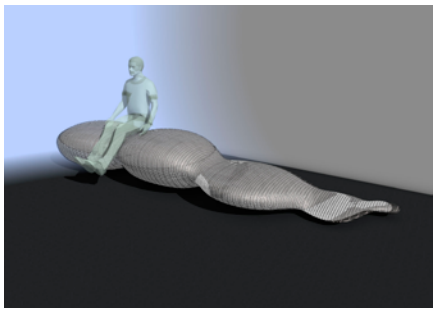
3D rapid prototyping and manufacturing has reached a point where many ideas to deposit a new layer of habitation can be quickly and easily exchanged. Theoretical and practical domains can be more productively interconnected. New 3D printing systems excel in allowing for fast design and iterative customization and the manufacture of viable architectural components.

#Additivism calls for a re-examination of space and the way it may be used to design and create construction systems that can be reconfigured and used in site-specific ways. The idea is not to focus on any specific individual technology output itself – as there are many paths, techniques and materials to use – but to see the 'big picture' of how interchangeable and adaptive these technologies can be to people, place and materiality. There should be no presumption of a single fixed solution to a problem or challenge – and the results should also preferably be easily manufactured and 'scalable'.

'Additive manufacturing' is not just a simple deposition layering process, but a theoretical and conceptual approach to combining and adding to form and function and respond to immediate input.

What follows are a few speculative examples of architectural builds with possible structures and component systems. It includes visualized examples of colonizing walls and crevices with a selection of ephemeral emergency refuges and more permanent structures.





• Emergency refuges built for public seating

1 • COMBINE PUBLIC ART & PUBLIC HOUSING: DEPOSITING A NEW LAYER OF HABITATION

Consider it a way to acknowledge the multiple users of contemporary urban landscapes, including entrenched marginalized communities, and to manage a fully integrated 'public realm' with a more diverse input, using artists, designers and engineers to provide guidance and enhancements.

Consider it as using technology to participate in broken systems through intervention and active representation; finding the holes and niches to allow for useful habitats within public spaces.

Cities and nation states will often commit vast amounts of resources to superficial decoration of non-functional social and public spaces citing this as an essential social 'need', while real attention to more relevant social requirements and activities are often ignored. Just as our cities erode and break down, in a somewhat organic way, we should attempt to rebuild and create a new layer of habitation in and on them.

There is a large array of people with knowledge and research invested in this type of approach. We need to build real interaction between professions, arts and trades engaged in discussion around public space.

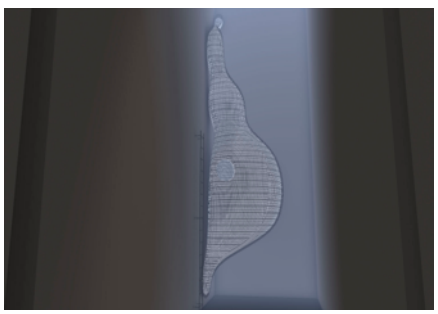
By bringing together interested parties and placing more thought on the use of rapid design resources and manufactured materials a more positive outcome might be achieved.

While the scope of this may seem too unwieldy or impractical it is worth noting there is already a large array of people with knowledge and research invested in this type of multi-field approach and with an interest in solving the same problems. There is a genuine interest and desire within many communities to have meaningful interactions with this type of project.

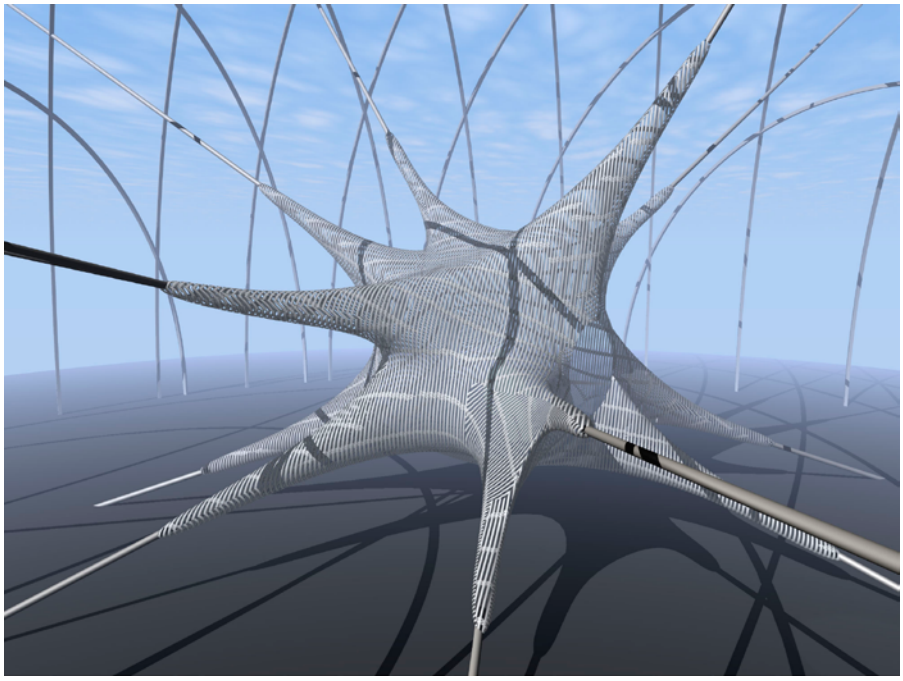
There is more to this than simply exploring parasitic architecture where modular, adaptable,

A FEW SUGGESTIONS FOR PARASITIC ARCHITECTURE:

- Creating public space niches explicitly for the express purpose of transient habitation and interaction, e.g. while building a wall to keep transient people out of an area the resources might be better used to provide structures that demarcate a clear border but that also give shelter and invest in other social services and structures to help redirect energy into resolving the underlying problem in a positive way and inviting participation.
- Creating guidelines for the use of public space to make allowance for interconnected social spaces that can be used specifically to erect transient structures for multiple use, including housing, business and social events, e.g. spaces designed specifically to allow for 'pop-up' galleries, markets and other like businesses.
- Planning publicly funded housing and arts projects to incorporate a wider range of approaches to possible materials and resources used in planning and building processes so as to include those that may be considered shorter term and adaptable or easily interchangeable or replaceable, i.e. assume a 'roll-over' component of adaptable and flexible housing designs that will change often and regularly.



• Wire-like fabric structures designed to use crevices in urban landscapes.



• Dynamic suspension domiciles for use in difficult situations

transient and exploitive structures force relationships with host buildings.

Artists, designers, architects, engineers and social urban planners have all played a significant role in theorizing and conceptualizing the possible end use applications of these types of technologies. However there is still a large gap between them. A significant change in direction is required at this point to bring about practical outcomes.

Although the focus here is on densely populated urban centers, there is no reason to limit this approach to urban areas as remote communities would likely benefit significantly as well from the resulting available customization and mobility of structures and direct community involvement.

2 • BUILDING AFFORDABLE SOCIAL ARCHITECTURE

Ephemeral structures, modular and mobile housing systems have been explored extensively over the years by those working as architects, design engineers and others with an interest in social needs.
The basic problem of providing a 'home' is the human need for personal shelter and safety and preserving a sense of identity within a social context.

The focus for development should be about how spaces can be colonized and how structures can be quickly erected, added to or adapted for other use, and either easily removed at a later time or allowed to erode or dissipate naturally. Along with this is the factor of how they might be interconnected and how they should use public and private services with the most minimal impact.

Longer term structures that are more 'permanent', mobile or made with longer lasting resources can also be included in these designs. There is no reason why these projects should be seen only as ephemeral or short term.

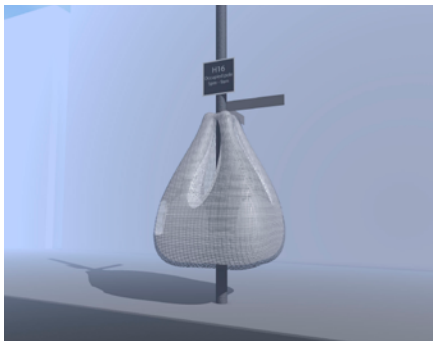
One idea for a viable method of creating and supporting displaced communities finding more acceptance is one of providing minimal public or community developed housing. Research shows this to be one of the more cost effective ways for temporarily relieving the stress being placed on communities and their local government.

SOME OF THE PRIMARY NEEDS AND ISSUES FOR THIS TYPE OF HABITATION:

- Protection from weather and damage considering resilience or longevity of materials – sun, wind, water and other natural forces that cause physical damage;
- Personal security and privacy as controlled interactions with other people – potentially positive, as with family and friends, and potentially negative, with hostility from social interactions and legal intervention;
- Safekeeping of possessions;
- Hygiene and sanitary facilities including cleaning of clothes;
- Obtaining, preparing and storing quantities of food;
- Identity – providing a permanent location for communication and contacts.

AREAS THAT HAVE BEEN HISTORICALLY EXAMINED INCLUDE:

- Emergency events such as natural disasters like floods and earthquakes where immediate emergency shelter is required, but also housing that is possibly going to be needed for an extended period while more permanent structures are built.
- Conflict situations where significant populations have been displaced or forced out.
- Transient working populations employed on fly-in-fly-out contracts in remote areas.
- Large event scenarios where short term shelter is needed.
- Basic social services such as providing safe housing for the homeless and economically challenged.
- Convenience shelter such as pod and cubical style accommodation located in high traffic public spaces such as transportation hubs.



• Suspended structures for ongoing 'popup' habitation

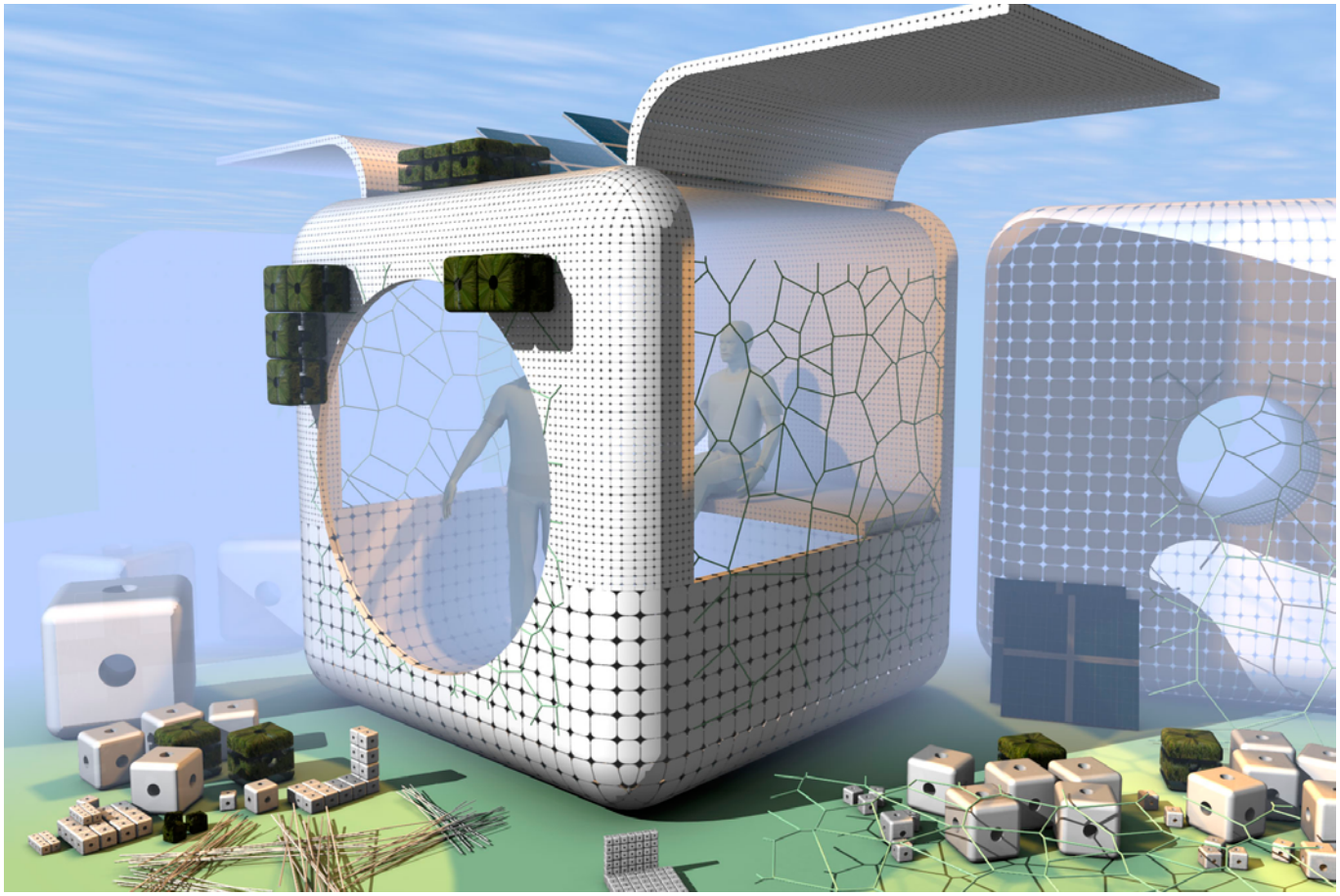
The scale of 3D printing systems output has reached a viable point where the whole process of design and manufacturing of housing components can be applied to a larger planning and production scenario.

Many manufacturing industries have already employed automated computational production for a very long time to produce mass architectural surface and component objects, using injection vacuum molding, laminating, lathing, profile cutting, encasing, sculpting, liquid glass forming and other techniques. But most of these have been large purpose-built production systems designed for a single output with little option for customization and iterative 'learning' design processes. New 3D printing systems excel in allowing for fast design and iterative customization and manufacture of components. They also fit perfectly with the 'Lighter, Quicker, Cheaper' (LQC) concepts of creating and testing a project immediately and with direct community involvement. Aside from the obvious speed of design and production, probably the most useful adaptations that 3D printing techniques can provide are unusual complex design combinations where the unique material combinations and direct customized end-use product design can have multiple uses. A 3D prototyping system is well suited for building construction components that allow for quick assembly and interconnections to be made with basic services.

Recently plastics have been seen as the primary cheap direct 3D printing material, however this is rapidly changing. There has been a long history of other forms of computational 2D & 3D output. Useful CAD and CAM 3D printing systems can include water-jet and laser profile cutting, SLA, SLS, Polyjet and a wide range of other material lathing, sculpting, excavation, fusing, erosion and deposition systems including systems for producing food. Included in this mix is the integrated use of constrained organic reproductive methods of plant and algal growth – both controlled naturally and within

USEFUL COMBINATIONS OF 3D PRINTING+ MATERIALS

- Movable channeled surfaces to grow plant and algae to provide food production, help direct water movement and provide adaptable thermal and light insulation. This fits well with recent developments in hydro and aeroponics.
- Replaceable absorbent surface units impregnated with nutrients and seeds for plant growth and decoration.
- Combining solar panels or micro wind channels and electrical conduits for connectible and expandable power production, conversion and transfer.
- Lamination of alternate conductive and non-conductive surfaces to create large scale electrical pathways similar to silicon chip manufacture. This can also include embedding objects and useful utensils like electrical devices into structures and surfaces.
- Extruded fibers or mesh formed into shapes and then covered by deposition to harden for structural integrity, e.g. used to create underlying structures for building concrete and ceramic surfaces.
- Free-form interlocking structures that can be quickly formed into various shapes and then locked together with a deposited surface layer or wrapped with a mesh.
- Interlocking profile cut surfaces used to make structures which can then be clad or wrapped with cloth, metal or other flexible meshes, as is now a common building technique. The profile cut materials can be made from silicon, plastics sandstone or timber.
- Construction units that can use surface textures to adhere to other surfaces and aggregate and form cohesive self-supporting structures.
- Self inflating bonded surfaces.



• Fully scalable modular component system for housing

systems such as hydroponic and aeroponic structures. This may be used to create very slow growing deposition systems where the form and surface continue to be laid down or created very slowly.

3D printing combined with further material deposition over the 3D printed structures is a useful way to approach this as well. All manner of materials can be attached or layered on core frames and bridging structures. This can extend to various thickness tissues, skins and fabrics.

Through these tools we have access to a malleable and resilient 'atomic' like modular and organic creation system that can incorporate and combine living and dead construction tissues. These component design and construction methods can be used at a low level with simple objects of 'play' and at a more developed level with industrial production systems for food and general commercial products, e.g. hydro/aero plant growth production, light reactive glass and plastics and surface/wireless conductive power transfer systems, inflatable bonded and sealed surfaces.

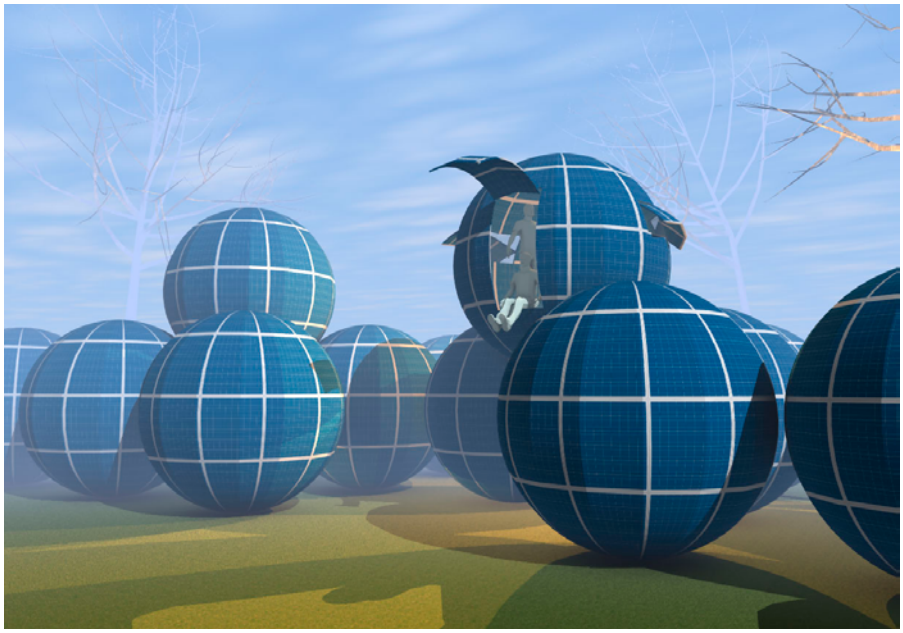
The rapidly developing '3D printing plus' technologies provide a dynamic and cost effective framework to help facilitate these changes. Additive blending and layering of surfaces that attain specific outcomes is desirable in a single component unit. These can include composite materials like resins that bond or harden on contact during the printing process, embedded electronics or methods of 'after print' infusing methods such as those used to bond metal ceramic dust and other materials through chemicals and heat.

This will obviously be the way additive 3D printing will continue to develop – the inference being that as the industry develops more of these complex multi-material surfaces and layering techniques, they will become standard for producing larger and more useful architectural grade products.

3 • PROVOKING COMMUNITY ENGAGEMENT WITH 'DISPOSABLE' ART AND DESIGN CONCEPTS

There is a permanent 'critical mass' of transient and malleable human populations that should drive the need for a reassessment of how and where people gather, interact and live. The way people communicate, consume and interact requires quite different structures and spaces to resolve issues around the design of public space.

Cultures are diverse and splintered and public spaces are being colonized and used in new ways. Until recently these 'public' spaces for interaction mostly have been after thoughts, dominated by 'thought remnants': a call to disjointed histories and dysfunctional



• Fully mobile component housing incorporating power generating surfaces

architecture, relying upon default actions of participation, design and fabrication, leading to a monumental sculpting of public space using hard surfaces and inflexible materials, often mapped on denuded and degraded 'green spaces'.

Worldwide there is a change happening with permanent bodies of transient working populations, mass production industries being reconfigured and displacing communities on the move and refugees moving from places of conflict to more stable environments.

Finding adequately configured social housing for these now constantly mobile dynamic populations is becoming a critical issue. There has been a wide range of ways to approach this including simple exclusion and policing to force compliance. Emergency living support systems are being developed such as the 'tent in a box' systems used for post disaster scenarios.

We are living in the moments between the edge of self-replicating technology and the blending interface of the organic and inorganic; where the spectacle of decay and erosion meets with reconfiguring, reuse and integration of technologies and materials.

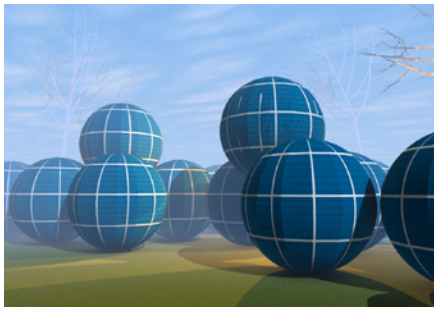
This change also includes the promotion of community driven gardening and food production in urban environments, guerrilla gardening in disused or abandoned public space, alternative power generation systems and multi-use environments and objects.

By carefully examining public space and the way these may be used – we can design and create construction systems that can still be reconfigured and used in site specific ways, as remains familiar to traditional land use, where nature, seasons and social occasion combine to inform land usage and the experience of habitation, with structures made, remade and composted.

There are many existing examples of successful active engagement with social and community design processes that bring together artists, designers and architects to create something more than we can produce individually.

A FEW SIMPLE CONCEPTS AND EXAMPLES TO CONSIDER:

- A habitat using many simple free-form interlocking objects which form a self-supporting structure to which a protective surface mesh can be applied.
- A habitat from interlocking units of various sizes that can be used to form an enclosing self-supporting structure.
- A clinging 3D structure system where printed objects can be thrown together loosely to create self-supporting constructions.
- A habitat from a series of interlocking tiles. Possibly a linking channeled brick-like system to quickly create simple rigid and insulated structures.
- A habitat from wire-like fabric structures designed to use crevices in urban landscapes.
- A habitat from fabric structures designed to attach to walls in urban landscapes.
- A habitat from a tensioned fabric structure that can be suspended between buildings in urban landscapes.
- A suspended extruded fiber habitat that can be attached to walls and poles in the urban environment.
- A profile cut form to which a fabric is attached to form an outer shell.
- A simple monolithic form that is designed to be inhabited.
- Emergency refuges inside public seating and transport shelters.
- A discrete mobile habitat form that can be easily disguised.



Joey Holder	The Evolution of the Spermalege	2016
Author	Project	Year

#fabulation	#postnature	#bridge
Format	Theme	Action

A series of interspecies sex organs, modeled on insect genitalia

THE EVOLUTION OF THE SPERMALEGE

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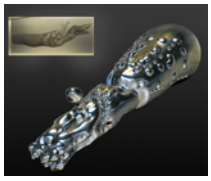
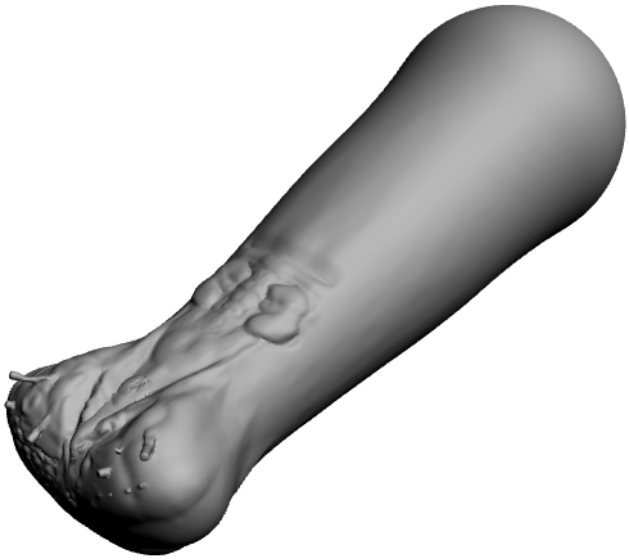
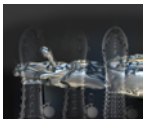
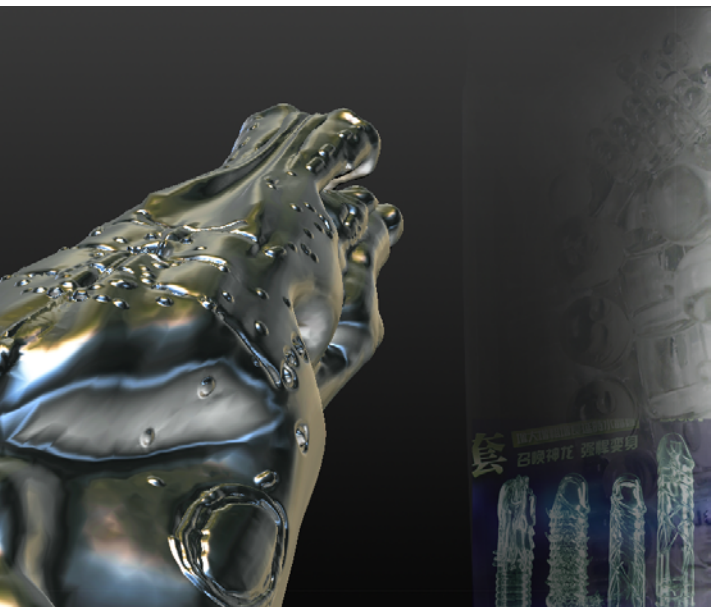


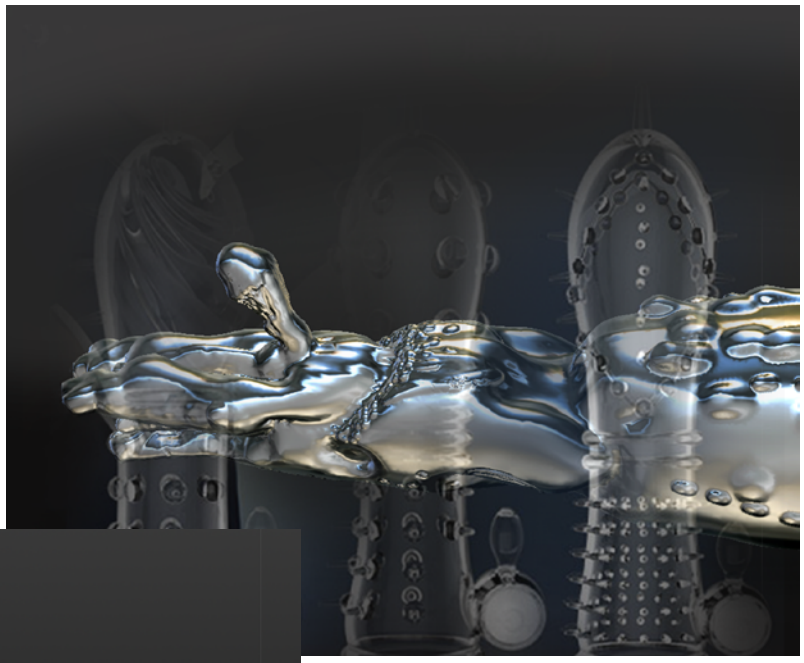


Traumatic insemination, also known as hypodermic insemination, is the mating practice in some species of invertebrates in which the male pierces the female's abdomen with his penis and injects his sperm through the wound into her abdominal cavity (hemocoel).[1] The sperm diffuse through the female's hemolymph, reaching the ovaries and resulting in fertilization. The process is detrimental to the female's health. It creates an open wound which impairs the female until it heals, and is susceptible to infection. The injection of sperm and ejaculatory fluids into the hemocoel can also trigger an immune reaction in the female. Bed bugs, which reproduce solely by traumatic insemination, have evolved a pair of sperm-receptacles, known as the spermalege. It has been suggested that the spermalege reduces the direct damage to the female bed bug during traumatic insemination. However, statistical experiments showed no conclusive evidence for that hypothesis, hygienic protection against bacteria being the preferred explanation for that organ.[2]

The evolutionary origins of traumatic insemination are disputed. Although it evolved independently in many invertebrate species, traumatic insemination is most highly adapted and thoroughly studied in bed bugs, particularly Cimex lectularius.[1,3] Traumatic insemination is not limited to male-female couplings, or even couplings of the same species. Both homosexual and inter-species traumatic inseminations have been observed.







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Much of Joey Holder's work references 'weird nature' or 'species-othering' and features an array of creatures that don't seem to fit within the fabric of our usual day-to-day existence. 'The Evolution of the Spermalege' is no exception, and she has created 3D printed silicon dildos based on insect genitalia.

Insects have some of the strangest mating practices in the animal kingdom: honey bees penises snap off and explode, female praying mantis eat their male partners (sometimes even during copulation) and male bedbugs use their scimitar-like sexual organ to impale the female bedbug's body and deposit the sperm. Like bedbugs, bean weevils (Callosobruchus analis) also use this process of 'traumatic insemination' to mate and one of the 3D models is based on this spiny penis.

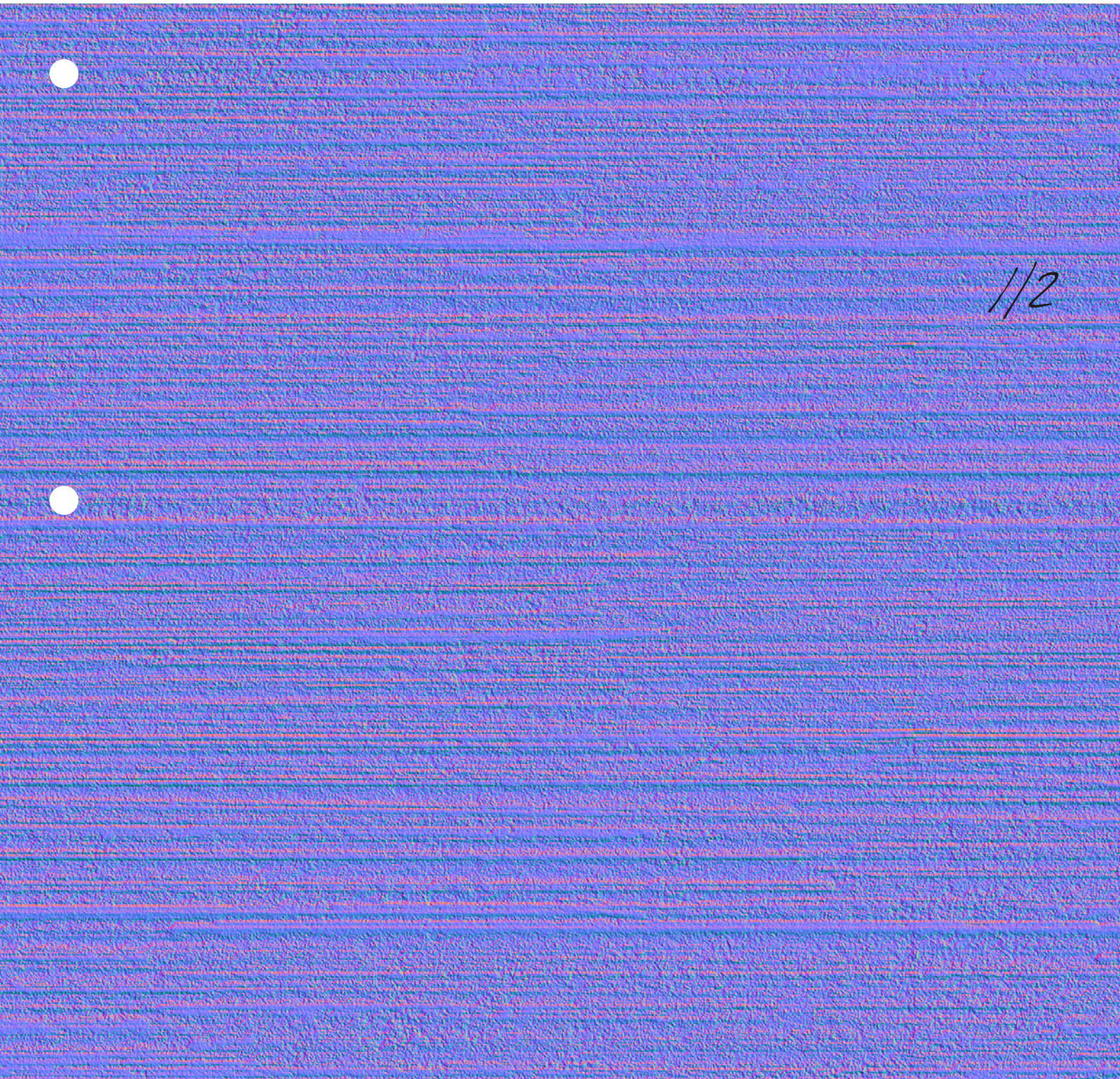
The models express the myriad of exquisite forms found in the animal kingdom which are often invisible to the naked eye.

Alan Warburton	3D Print Simulator	2015
Author	Project	Year

#device	#matter	#bridge
Format	Theme	Action

Tilable map for simulating the finish of 3D printed objects

3D PRINT SIMULATOR



3D printing is time-consuming, complex and expensive. The human labor involved to ensure a print is a success can often send costs spiraling out of control, and often the end product can be disappointing: fragile, distorted and structurally unstable. 3D Print Simulator reclaims the 3D print and re-virtualizes it. In doing so, it urges a re-evaluation of the problem 3D printing supposedly solves – how an immaterial medium (CGI) can participate in traditionally materialist economy. Do we need to touch something, to own something, to value it? Does it need to be constructed from a finite natural resource to participate in a market? Returning the 3D print to an immaterial visualization therefore returns us to the very contemporary and unresolved conversation about digital craft and how to quantify and value it.

3D Print Simulator eschews the tendency to fetishize the 3D print by attending more closely to its most disappointing and tricky formal qualities, specifically its striations and particulate noise. In doing so, it not only focuses on an obvious resemblance to geological sediment that calls to mind the material ancestry of oil and plastic, it also opens up a wider line of questioning to do with the complexities of production.

The flimsy, hollow, grainy 3D print is an unwitting symbol for an age that views technology as redemptive. The 3D print – like the iPhone, the Nest Thermostat or the self-driving car – is expected to ‘just work’ and the fact that it doesn’t is interesting. All the pitfalls and contingencies of 3D printing point towards an uncomfortable and inconvenient reliance on human labor and unstable materials. The expertise involved in fixing a 3D model so it can be printed is hard-won and the degree of human problem-solving should not be underestimated. If it is, we capitulate to the devaluation of labor in the name of frictionless tech. This project ironically removes the human friction as a means to drawing attention to it.

The work consists of a 2000 x 2000 pixel tileable ‘normal’ map. This type of image is used in CG software to simulate surface texture on a digital model. It can be plugged into either a bump, normal or displacement file node, works on any 3D model and in any 3D package. It requires little expertise and avoids disappointment and waste.

INSTAR III: EXCERPTS FROM THE GP CHRONICLES OF SCION UMA OICKLE

“THAT DREAM STATE CONSISTED OF A FOLDING OF PROTEINS, BATHED IN THE AROMA OF DAMP FIBER AND EXPRESSED IN A MULTITUDE OF FORM.”

The infinite desert of the Scarlet Sector had long been quarantined. The region was forgotten after the contagion of the *SinNombre-ICD10S™* Virus had suffocated the human populace for multiple generations. *Confederation*® drones fully monitored the sector but there were no extractive interests so the *PATERNAL ORDER*© had simply stamped the area 'OF NO CONCERN/BARREN' on the obsolete *3DtopoPrnt℠*. No *4DtopoSims℠* with a timelink existed. The land had fallen into locative amnesia.

Turk was struck by the contrast of this place compared with what most of the terra had become. He gazed out across carminic-colored cliffs, untainted flowing water and living chloroplast-filled canyons. The visible sun was blindingly bright and he had no need for his urban *deClogVisEVisers™*. The Bear's Ears region was close to the descriptions in his GrandParents' parchment journals now brittle and yellowing with age. These journals had fascinated him but it took many years of laborious study to learn how to discern the ancient cursive writing of intertwined ink patterns now lost but to a handful of scholars. The pages contained hand drawn maps, sketches, and observations both mysterious and tactical providing him with enough content to consider the NOCONCERN/BARREN Expedition.

In his youth, Turk's explorations had been off to the newly accessible planetary clusters and belt objects. He had a cultish following that enabled him to make a modest living transmitting and projecting back his far-flung wanderings via *7DREALeyes™*. Twelve years ago he was named *PolydimensionalExplorer™* of the year. So now, on his own planet and within his *Confederation*®, he was making this earthly journey to a place more unknown than the trans-Neptunian objects.

Getting here in the old '74 had been a long arduous journey. To facilitate this far-flung surface travel Turk used the abandoned network of deteriorating roadways by repairing them with the *SUCITTUPP*™ Flat printer, it's continuous drive peeling up the highway base behind him and layering the material down on the road ahead. He drove the original '74, revered as a family heirloom – the very transport that his GrandParents used when they visited this sector. Turk hybridized the vehicle to nostalgic versions from the era of metal and fossil-fluid plastic assemblages using dataform parts catalogues.

He reprinted the hulky '74's main shell carapace as a solar sink, needed for propulsion when direct atmospheric residue aspiration could not be pulled from the postindustrial pollutant-rich airspace beyond the megacities' leaden veil of *sinthaChemicals™*. The aging but reliable *3DSwuzi™* printer in the '74's bed had allowed him to replace damaged parts and tires along the way. His expedition gear bundle consisted of a swarm of outmoded and prototypical printers, the *GASPeratore™* with a stock of raw pollutant material for device backup, and the fragile fiber journals.

His arrival was a venture of place and the stories his GrandParents had related to him as a young boy still preserved in the cryptic journals. Most people would have accessed the tissue bank of their GrandParents, *CellBlaasst℠* printed the GPs into existence with the *6DCorporealPrintBOT™*- wiring in a few robotic parts for gestural presence – listened to their stories – enjoyed a visit of convenience with them – then re-banked the dessicated cells back onto the matrix/blotter raft. His GrandParents had refused the *EverlastScan4DEver℠* that would have allowed their progeny to know their material selves. In later years, they rejected any skin degradation management even with the availability of *Cellular3DEnHANCEment℠Sticks*™. The unique lines of their crevassed faces were embedded in Turk's memory. His GPs became increasingly despondent as they aged and one day vanished – escaping the *TechnoCracy℠* that decreed *'Dermal Perfection and Epilators for All!'*©

Turk climbed up to the canyon cave balcony above him. Shallow indentations marked the cave's smooth sandstone floor. Human footprints transforming to bear pads – to hooves – and finally to large-toed avian impressions ending at the precipitous cliff edge with only the expanse of sky beyond. Had this been some strange chimeric creature from the past that could transform much like the *ChimerOBots™* that could 4D self print and propagate in real time? He sat on this precipice wondering if his GPs had been in this very spot.

He got up quickly to naturally eye scan the landscape, his head meeting the knife-edged rock above. Blood began to pour down his face. Turk needed to act quickly as a wound in this once SinNombre viral laden environment could be fatal. He pulled out the small *FirstAidMorphoGenic4DPrintBot™* and removed the *MicroPropagationRaftpad TM* that would enable the explant cells coupled with his plasma clots to overwrite the gaping laceration with new epithelia. He reached for his replacement cells but in his euphoric haste for investigation he had left them back at the campsite in the old '74. A truly stupid and potentially lethal omission. He could *bioPrrobe℠* primary cells from himself but the bleeding was profuse. His hand reached for the talisman that

hung around his neck. The ampule contained his GrandFather Jon's memory cells, neural tissues *bioPrrobed℠* and *bi-OKEPT℠*. It was the one living *biobitByte©* he still possessed of his GrandFather. His head was hemorrhaging.

What the hell? He loaded the GF explant cells onto the printing *MicroPropagationRaftpad™*, placed it over the laceration and covered all with the *4DMorphogenicFlexChamber™*. He sensed his GF's presence as the cells repopulated and covered the gash. The wound was mended and he walked down canyon.

The landscape was filled with verdant botanic-forms. He noticed what he believed to be Asclepias syriaca with its nectariferous, pink clusters and broad ovate-lanceolate whorls. Examining the velvety soft leaves, he discovered conical-shaped fibrous pods attached on the underside. He pinched a pod off to look more closely and sensed the energy within. He popped it in a *SynthaVial™* complete with its *EnvirOChipEE™*.

After returning to camp, he scanned the soft casing and uploaded the entity repro into his *MindDryve™*. The analysis determined that the bite size protein source was one of the nutritional mainstays of the general populace, now synthesized and produced in the megacities' fermentation farms. A fortunate find, as he would have a ready food source for the duration of his explorations. He set his *searchBiohmBott™* into scan, sequence, express and print modes. He then loaded the entity's data into his *BiohmBott™* with LIKE settings added, sending it back out for more sampling.

Turk pulled out his GrandFather's vintage 'mummy sleeping bag' stuffed with the soft down feathers of a species long extinct. Printing up a hammock and stretching out, he took out the timeworn journals and began to read. His eyelids grew heavy and sleep engulfed him. His dreams drifted to his GrandMother, but not as he remembered her. She was young, vibrant, and smiling, roaming along the cliffs above him. He was filled with seductive thoughts of her as he felt his GF's smile emerge on his face. In his dreams he slept next to her in this same sleeping bag, less threadbare and compressed.

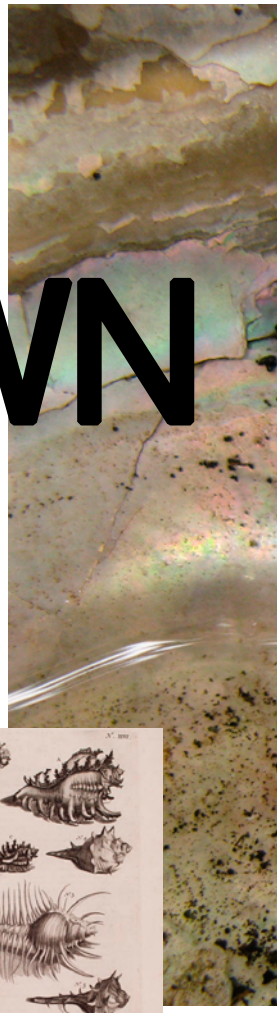
He vaguely sensed the *BiohmBott™'s* return and felt a fanning of air currents above and around him. Delicate gusts stroked his body, folding him into a 7-dimensional trance of simultaneous aging and embryonic metamorphosis as the hammock seemed to tighten snugly around him in an energetic protective envelope of rest. That dream state consisted of a folding of proteins, bathed in the aroma of damp fiber and expressed in a multitude of form. The sensory field consumed him – a meditative space of the transformative residue of an emerging being. Turk didn't know how much time had passed when he finally awoke, swaddled and encased in the silk mesh of a human size cocoon – crosslinked and interwoven in the *BiohmBott™'s* retrieval mission. Beyond his inner void he could still hear the recurring sweeps of air and detected flying beings hovering and encircling his new fibrous home.

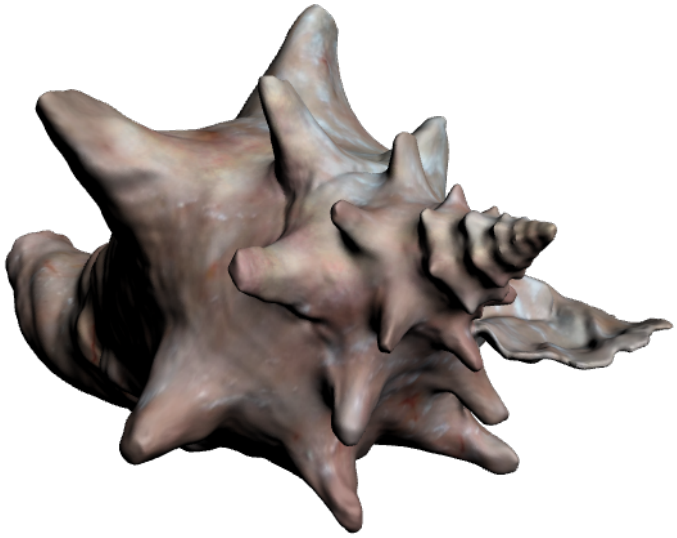
Emma McCormick-Goodhart	Stones of Their Own Kind	2016
Author	Project	Year

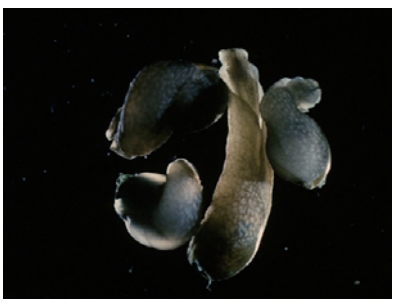
#methods	#postnature	#extrude
Format	Theme	Action

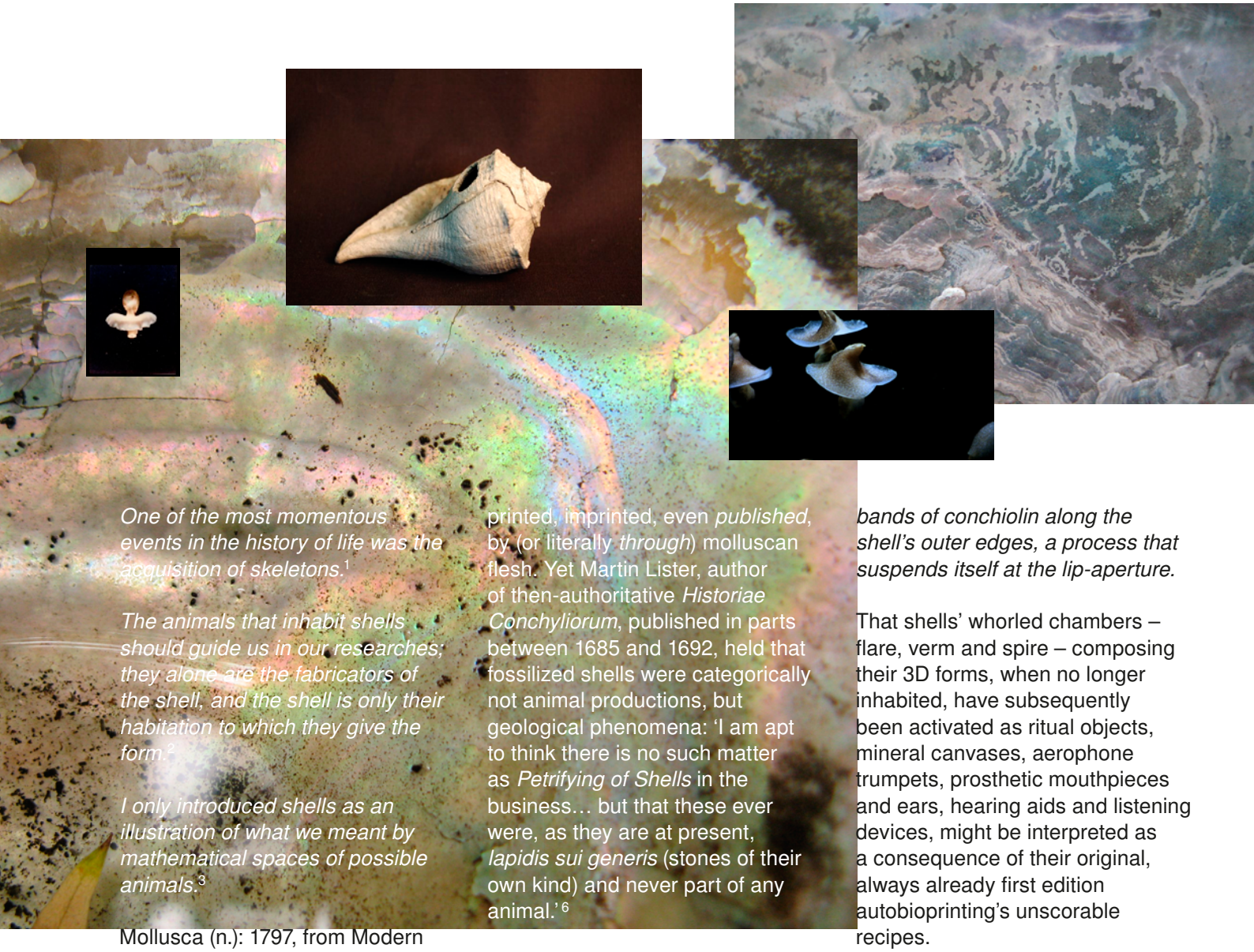
Are shells the primordial 3D printed exo-object-extensions, the outcome of an incremental, parametric 'rhythmic event' of extracellular secretion?

STONES OF THEIR OWN KIND









One of the most momentous events in the history of life was the acquisition of skeletons.[1]

The animals that inhabit shells should guide us in our researches; they alone are the fabricators of the shell, and the shell is only their habitation to which they give the form.[2]

I only introduced shells as an illustration of what we meant by mathematical spaces of possible animals.[3]

Mollusca (n.): 1797, from Modern Latin *mollusca*, chosen by Linnaeus as the name of an invertebrate order (1758), from neuter plural of Latin *molluscus* 'thin-shelled', from *mollis* 'soft'.

Secretion (n.): 1640s, 'act of secreting;' 1732, 'that which is secreted', from French sécrétion, from Latin secretionem 'a dividing, separation', from past participle stem of 'to separate, set apart'.[4]

Are shells the primordial '3D printed' exo-object-extensions – animal productions and biosignatures (albeit without DNA or cells once expressed as shell material, contra bone) – the outcome of an incremental, parametric 'rhythmic event' of extracellular secretion? Both life forms and forms of life; performed formations, perdurable body-becomings, choreographic objects[5]; printed, imprinted, even *published*, by (or literally *through*) molluscan flesh. Yet Martin Lister, author of then-authoritative *Historiae Conchyliorum*, published in parts between 1685 and 1692, held that fossilized shells were categorically not animal productions, but geological phenomena: 'I am apt to think there is no such matter as *Petrifying of Shells* in the business… but that these ever were, as they are at present, *lapidis sui generis* (stones of their own kind) and never part of any animal.'[6]

A shell is an exoskeleton formed by calcifying organisms of the phylum Mollusca. Shell material is generated and maintained over the organism's lifetime by its mantle, specialized tissue located on the outer portion of the body, which secretes proteins and minerals upwards in layers that crystallize or calcify to varying degrees. First, a layer of conchiolin is pumped into what becomes the outermost shell, followed by a prismatic layer and, lastly, by an inner nacreous one, together forming a continuously operative scaffold. In gastropods, a 'protoconch', or cap-like larval shell, will metamorphose into a 'teleoconch' after undergoing a 180-degree twisting of the body, known as torsion, such that its shell coils in radial asymmetry. Never shed, a shell expands to accommodate its maker's lifetime bodily growth via the addition of bands of conchiolin along the shell's outer edges, a process that suspends itself at the lip-aperture.

That shells' whorled chambers – flare, verm and spire – composing their 3D forms, when no longer inhabited, have subsequently been activated as ritual objects, mineral canvases, aerophone trumpets, prosthetic mouthpieces and ears, hearing aids and listening devices, might be interpreted as a consequence of their original, always already first edition autobioprinting's unscorable recipes.

I was by sound, near seawall, at ocean-stream; I dwelt alone in my first resting place… Little did I know that I, ere or since, ever should speak mouthless over mead-benches.[7]

1 Geerat Vermeij, 'The Origin of Skeletons', PALAIOS Vol. 4, No. 6 (1989): 585-589. doi: 10.2307/3514748.
2 Peter Williams cites Thomas Say, Snail (London: Reaktion Books, 2009), p. 26.
3 Richard Dawkins, Climbing Mount Improbable (London: Penguin Books, 2006).
4 Both entries from www.etymonline.com.
5 In his essay 'Choreographic Objects', William Forsythe asks: 'Is it possible for choreography to generate autonomous expressions of its principles, a choreographic object, without the body? … A choreographic object is not a substitute for the body, but rather an alternative site for the understanding of potential instigation and action to reside.' http://www.williamforsythe.de/essay.html.
6 Peter Williams cites Martin Lister, Snail (London: Reaktion Books, 2009), p. 79.
7 Old English riddle.

A CAUTIONARY NOTE ON THE PERILS OF PURSUING 3D PRINTING AS A HOBBY

"IF THE THOUGHT OF YOUR PASSION, FOR ADDITIVE MANUFACTURING, BEING DISMISSED AS A HOBBY IS OFFENSIVE, YOU MAY WELL BE AN ADDITIVIST."

Often, 3D printed output is no more than glorified Spirograph™. The mathematical functions represented by seemingly impossible gyroids are the 21st Century equivalent of the 2D hypocycloids and epicycloids diligently transferred, to paper, via the medium of ball-point pen and the perforated cog.

Also, 3D printing is reminiscent of the String-Art craft so popular in the 1970s – the pins set out the parameters of the design in advance, and the string 'body' is applied layer by layer.

But, Spirograph and String-Art were not about the output, they were about the experience and satisfaction of creating, and the exploration of the potential of the process. Much like the thrill of watching a plastic facsimile of the design you created, or tried to copy, growing slowly on a 3D print-bed. Your delight is palpable and you can't wait to experience it again – so you make another, and another until you are faced with a storage/distribution problem, (which is ironic in the extreme as 3D printing could be the ultimate solution to both storage and distribution problems.)

The Spirograph and String-Art creations of our childhood were passed on to unsuspecting relatives who, while impressed initially, were then obliged to find some place of honor from which to display it. History is likely to repeat itself when the pointless knick-knacks that 3D printing devices are churning out, with exponential rapidity, are similarly received. As we begin to amass artifacts egested via the process of our 'hobby' – we then begin to assign each item to the significant life events of unlucky relatives. E.g., 'My Dad would love this for his birthday!' (He won't) or 'My sister would really like that for Christmas!' (NO SHE WON'T!)

In 2012, craft proponent, Tanya Harrod said, 'At a household level [3D Printing] will attract a sizable percentage of hobbyists' meaning that the predicted ubiquity, of 3D printing, won't extend beyond the professionals with access to high-end, high-cost equipment or art schools and design departments, and that what we can expect, at consumer level will be little more than the 'pleasure-user'. Her promise that 'They won't follow the trajectory of home computers or mobile phones' remains entirely valid, however, the emergence of FabLabs and the oncoming storm that will be networked, remote, 'printer farms', is proving some of her prediction wrong.

As a champion of the professional craftsperson it can be assumed that Harrod is not using the term 'hobbyist' in a complimentary fashion – and nor should she.

Of course, not everyone thinks the term Hobbyist is a dirty word, indeed many 'hobby' activities are conducted with the utmost passion and seriousness. However, the fact remains that a hobby is defined as a pleasurable pastime – a distraction, it's considered fun and even frivolous; and, the term is ubiquitously used to dismiss, devalue and demean – especially in the case of artistic endeavors. This lack of credibility is what Harrod means by Hobbyist and, as such, is a term that should only be self-appointed. If you like the name – feel free to use it.

But what if you don't? If the thought of your passion, for additive manufacturing, being dismissed as a hobby is offensive, you may well be an Additivist.

Additivists do not have to justify the procurement of a 3D printer by insisting it will be an invaluable tool for making replacement parts for obscure equipment – After all, there is no sense in making slow, expensive and sub-standard replicas of stuff that already exists, in our current global networked marketplace – Instead they are confident in the legitimacy of using 3D printing to test the limits of their creative discontent.

So…..which one are you?

Do you think Additive Manufacturing is a catalyst for exploration, discovery, agitation and disruption – or do you see it as a convenient process to make 'free' gifts for your friends? If it's the latter, perhaps the 3D Additivist Cookbook is not for you, on the other hand, it could be exactly what you need.

Harrod, 2012 . Rapid prototyping: *the right tool for our time?*, Crafts, no.231 Jan/Feb 2012

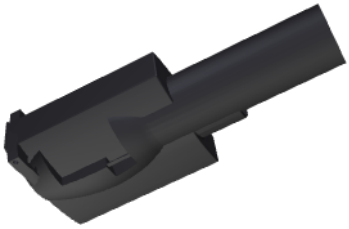
Urs Gaudenz	GT-200	2016
Author	Project	Year

#fabulation	#sense	#detach
Format	Theme	Action

Replication of the GT-200, the controversial ‘remote substance detector’

1/2

GT-200



The GT200 is a controversial ‘remote substance detector’ that was claimed by its manufacturer, UK-based Global Technical Ltd, to be able to detect from a distance various substances including explosives and drugs. The GT200 was sold to a number of countries for a cost of up to £22,000 per unit, but the device has been described as little more than ‘divining rods’. The owner of Global Technical, Gary Bolton, was sentenced to seven years in prison. This is a replication of the original device from pictures and descriptions found online. It operates in the same way as the GT200, using a swinging antenna to point to target material indicated via ‘programmable cards’ inserted into a reader.

THE PELICAN CASE IS WORTH MORE THAN THE CONTENTS
COMES WITH A TWO-YEAR WARRANTY
THE WIRES INSIDE WERE NOT CONNECTED
THE PLASTIC HANDLE WAS BEEFED UP TO LOOK MORE PROFESSIONAL
WHITE GLOVES WERE INCLUDED
DETECTION CARDS PROGRAMMED TO FIND...WHATEVER
THE CARD BOX HELD THE "SOFTWARE"
AN EVIDENCE TAG FROM THE BRITISH POLICE
Milton
safe+ sound

GT200
SENSOR CARD

A PAREDE *CURATORIAL STATEMENT*

CHEAT SHEET FOR A NON (OR LESS) COLONIALIST SPECULATIVE DESIGN

1/3

CURATED BY:

*Pedro Oliveira and
Luiza Prado
(A Parede)

LIST OF PROJECTS:

- Fannie Sosa: Black BioHack
- Lucas Odahara: Deceleration Recipe
- Tabita Rezaire: Peaceful Warrior
- Anonymous: Breaking Down the Walls Within

Despite its name, speculative and critical design has, for a long time already, greatly disregarded, ignored, or otherwise glossed over issues of race, class and gender privilege. This is a serious problem in a discipline that calls itself critical, and that allegedly strives to incite discussion on how issues that emerge in the present might unravel in a near future. In the past few years these issues have been identified, dissected, and thoroughly analyzed to both support and antagonism within the design community. While some claim that these criticisms greatly exaggerate the extent and relevance of the issue, other groups in the design community have shown great interest in fostering productive conversations about strategies for changing this stance within the discipline.

All in all, we believe there is quite a big elephant in the room: these are, clearly, issues that still need to be acknowledged and dealt with as serious concerns. Furthermore, the real challenge when discussing how design (and art, for that matter) chooses to represent the future lies well beyond 'representation' or the danger of tropes and tokenism. It is not enough to merely acknowledge the existence of non-Eurocentric, non-Western realities: it is important to question the very power structures (to which design contributes) that maintain certain ways of knowing, certain ways of living at the center, while pushing others towards the periphery.

Unfortunately, speculative projects and publications still rely on plenty of narrow assumptions, which continue to reinforce the status quo of colonialism and imperialism rather than effectively challenging it. To try to make things a bit easier, we developed this very simple and straightforward 'Cheat Sheet' you, Speculative and/or Critical Designer, should consult when developing new projects. This is (very) loosely based on Sandrine Micossé-Aikins' '7 Things You Can do To Make Your Art Less Racist' – which is a strongly recommended read for before and after you get through this cheat sheet of ours – as well as María del Carmen Lamadrid's 'Social Design Toolkit', also a mandatory read.

Cheat-Sheet for a Non (or Less) Colonialist Speculative Design 2/3

Acknowledge the Truth. This one we'll borrow straight from Sandrine. If you were born in Europe, there is a good chance your country had (or has) colonies and gave (or gives) them a very, very bad time. It is not your fault, and no, #NotAllEuropeans are like that. We also know that the USA, though a former British colony on its own, has given itself the task to treat other parts of the world as if its own backyard, something we call imperialism. Indeed we all know this, but so should you – it is a fact you cannot and will not change. So acknowledge that part of your privilege comes from the very fact that your society has built – and still builds – its wealth upon the disaster of others.

Check Your Facts. Ask yourself 'does my dystopia happen already in other "invisible" (sic) places of the World?' It is good to know if what would be terrible for you and your audience isn't already reality for others. Before asking 'what if…?' ask 'is there…?' Particularly if you consider how colonialism helped shape the power inequalities and uneven economic relations we currently live in. *(Tip: Wikipedia is a good starting point, but be creative and don't stop there.)*

'Am I developing more "civilized", "highbrow" or "educated" solutions for "endangered" places in the world?' It might be that you already know the answer to this, but double-check it. Constantly challenge your design decisions and see if they do not reflect narrow-minded views of how aesthetics could or should be. Minimalism and clinical asepsis are not the only aesthetically pleasant values of design.

'Is my scenario/story/object somewhere else's local aspect/culture, appropriated as to fit my own?' If yes, please refer to point 2 and check if your culture/country did not already do that a few years ago by the use of violence and other less friendly means. *(Tip: start from the basics of Cultural Appropriation. Yes, it is a very controversial topic and there is no consensus about it. Yes, you have to read it anyway.)*

'Does my dystopian scenario contain the following:'
Slaves or any depiction of middle-class (white) people suddenly turned into slaves;
People of Color in the role of Robots, Subaltern or others in general;
Objects coming from places that are or were colonies, whose aesthetics look invariably 'recycled' or 'kitsch'.

Is my research biased by my own privileged views of how society could or should be? Or in other terms, **'am I b(i)asing my research exclusively on authors and references that come exclusively from colonialist countries?'** This is very important, because as Raewyn Connell explains in her Southern Theory (2007), much of the so-called 'canons' of social sciences come from northern, metropolitan authors whose work inquiries the 'primitiveness' of the colonies.

'Does my textual production contain any of the following words:'
'global' for economic models;
'neutral' for cultural models;
'universal' for theoretical models;

3/3

In case you succeed on all of the above and will most definitely go on portraying your dystopia, the final question is: '**have I consulted myself with other people, designers or not, from other places of the world to check if this is not a #firstworldproblem?'**

We strongly believe that following these simple steps may positively contribute to not only Speculative and Critical Design projects becoming more powerful in their line of questioning, but also avoiding the mishaps it sets itself up so boldly to criticize.

To be once again very clear, we are also not advocating that every single speculative project should talk about, tackle or depict issues of colonialism and imperialism. Rather, we maintain, borrowing from Walter Mignolo, that 'you are where you speak.' If 'all design is ideological', as Anthony Dunne says, do take that statement seriously.

Curated A Parede

Fannie Sosa
Author

BioHack is Black
Project

2016
Year

#methods
Format

#figures
Theme

#bridge
Action

A critique of modern gynecology and the agency it enables, including the systematic erasure of Black and Indigenous knowledges

BIOHACK IS BLACK

NEVER AGAIN applaud poems about progress
while your people die at the hands of the state
NEVER AGAIN allow people to assert a lack
of intersections between experimentation and
people of color.

experimentation is fundamentally rooted in
blackness and wounded life: they don't get to tell
you otherwise
your body is an experiment.
your memories: an experiment
your life: an experiment
every minute is an experiment in survival
everyday is an experiment toward liberation

gringpo.com

The other day I was minding my own business on the Internet when someone[1] posted an article.

Entitled, *Bodyhackers are all around you, they're called women*, its author Rose Eveleth – a 'producer, designer, writer and animator based in Brooklyn who explores how humans tangle with science and technology' – establishes an analogy between her IUD and her RFID microchip. One of them lets her control her fertility and the other one unlocks phones and doors by waving at them.

She explains how the uterine device is never frowned upon, but the RFID microchip implant is looked at with suspicion, as if it was a dystopic device of surveillance: 'No one has ever jolted backwards and said, "You have a what in your uterus?" They have at the news of my chip. I call them both cyborg implants, but most people would only consider one of them cyborgian at all.' From then on, she analyses how we think about bodyhacking as the realm of men. A hormone releasing IUD, according to Eveleth, is the most significant bodyhacking device she uses, because '(...)the ability to control when I conceive is a power unheard of for thousands of years of human history', making of her a cyborg. Yet, she says, it is not thought about it as such because it is not a 'manly technology'.

———————— problematic ————————

(disclaimer: this is not, under any circumstances, a critique of no one's contraceptive methods. It is a critique, however, of modern gynecology and the agency it enables, as well as the systematic erasure of Black and Indigenous knowledges)

The notion of modern gynecology being the pinnacle of fertility management is racist, erasing, colonial and patriarchal. Womxn have been in control of their fertility since the dawn of times. Womxn

have been in control of their fertility much more often, in societies that worship khunt, where khunt epistemologies are allowed to cell divide in the womb of a fearless Black mother. This determinist frame of mind about fertility management as a 21st century western scientific prowess purposefully omits that modern gynecology (the praxis, the tools, the protocols, the language) was born as a tool to ensure seamless production of forced laborers, and is intimately linked with colonialism, slavery and settler capitalism. If we are examining how technology and how we think about it is oppressive, it seems ridiculous to stop at the gender reading and further a blurry notion that biohackers have been around us under the shape of the womxn on the right side of the barbed wire fence safeguarded by the extractive pharmaceutical complex, that have an IUD.

The invention of modern gynecology, such as practiced today in mainstream medical spaces, rests on the thorough study of how to make Black and indigenous womxn produce and reproduce in captivity, be it physical and/or institutional. Sexual and reproductive trauma, intentionally caused by the settler, was then dissected, explained and validated scientifically in medical plantations. To a great extent, modern gynecology still exists traumatically embedded in public hospitals, reservations, free clinics, prisons, detention camps, schools, etc. Whether it is forced sterilization, forced STD/STI inoculation, non consensual drug testing, criminalization of abortion, discriminatory laws, and inadequate social protection, gynecological violence still regulates Black and Indigenous womxn's bodies. This traumatic inheritance also regulates motherhood on a larger level, and the whole conceptualization of the womb as an inherently painful space. Pain is deemed normal through the lens of modern gynecology, be it during the menses, birthing, going through menopause, and all over an active sexual life.

Stating that the unseen bodyhackers are the womxn that have a copper IUD is a way of not so subtly erasing the history of gynecological torture and sexual warfare on Black and indigenous womxn. It is also an unforgivable act of erasure of the long herstory of fertility management, contraceptive, and abortive knowledge Black and Indigenous womxn have protected and transmitted from the margins. These particular knowledges have been purposefully burnt, its recipients persecuted and hunted down, for economic reasons: an autonomous womxn in control of her fertility does not a good slave make. If we are talking about cyborg capacities and biohackers, we could for example talk about Black womxn forced to birth yearly offspring for 20 years, birthing in the field and continuing to work on the field, still dancing to drums and receiving orixás that safeguarded their health. How did they survive? And how did they not? We can mention Mammies that lived until 125 years old to tell the story of how they protected their 30 plus year forcibly extracted milk: when breast feeding the master's children they called upon loa to slow down the oxytocin and prolactin release , so coming back to their own lactating children they still had some of the thick milk that was otherwise destined to strengthen white babies[2].

Can we talk about the descendants of the settlers in places of power, fed with Black breast milk, as a form of biohacking too? Can we talk about Harriet Tubman and her invisibility cloak, or how she used her Black womxn embodiment deemed illiterate, submissive, and disabled – serving at the master's table, to develop a cross-state abolitionist network? Can we discuss Blackness as a superpower? And can we formulate why the beyond-human character popularized for Black narratives is a less-than-human threatening personhood, the Zombie? Why is the cyborg white? Ain't I a superhuman?

Moving on and around, let's talk about the use of phytohormones to hack gender by non binary indigeneity. We could be talking about the practice of burying the placenta/mxnstrual blood near the gardens of the village. The DNA contained in the endometrial tissue is absorbed by the ground, making several plants customize their properties to respond to the needs of this DNA. This ensures food sovereignty and unites all the members of the community on a cellular level as they eat the food customized to best feed the mothers of the clan.

Maybe also let's mention how mxnstruating people living in physical proximity synchronize their cycles? What about the womb as a bodyhacking technology? Can this lead us to talk about the practice of co-mothering by mutualizing breast-milk amongst the clan's lactating children as a social bonding rite? The term 'sisterhood' becomes much more concrete when you have received care and breast milk from several people, building empathetic pathways transversally across the community. Thinking about this could lead us to remember a consensual Mammie: sharing her breast milk as a way to build kinship and alliances.

Let me remind you, Rose Eveleth from Brooklyn, that before your ancestors went through a mutation that made them white, there were matriarchs that build their progeny, or their lack of, in consent from the womb to their graves. They consented sexual encounters with a partner of their choice, they asked their community and themselves if now was the right time to bring forth life, and then they nested the consensual fetus in their pleasurable womb, until it came out consensually orgasmically to further a life based on thriving, in symbiosis with nature.

Do not try to fool yourself and us telling us that your IUD brings you 'freedom', adopting yet another level of colonial imagination to how we understand khunt. Your IUD was built on our back. You have a dystopian surveillance device sunk in your womb. The analogy between your RFID microchip and your hormone releasing IUD is sadly accurate. They are both cyborgian. But this article misses an entire and very important point: they are both surveillance devices, built on the back of Black and Indigenous womxn, serving a (re)productive capitalist agenda, and constituting an extractive cyborg body that I reject.

This particular use of the cyborgian status by the colonial imagination, disengaged from any racial/colonial/climate justice critical reading, is part of the oppressive epistemologies that reinforce white supremacist patriarchy. You cannot address cyborg as male without addressing it as white, cis-gender, able and extractive. Cyborg personhood was born from a critical impulse, as a way to rethink rights based on personhood rather than 'humanity'. This critical impulse of enlarging who gets to be considered a person, also present in animal rights, companion species manifestos, dis/ability studies, and queer theory, was fueled, modeled and led by Black and Indigenous womxn's organized resistance, yet we never see cyborgs as a Black or Indigenous womxn, neuro-atypical folx, nonhuman people, etc. Weather cyborg personhood is presented as something critical or uncritical, it is always dystopian when it is not conceived intersectionally all the way to inter-species alliances. The so called post-colonial, post racial, gentrifying, RFID microchip, hormone releasing IUD carrying human body who is cut from the cycles is not the body I aspire to bring forth. It's not the body of progress. It's not the body of freedom. It's not the body of choice. It's not the default body. It's not the cyborg body that I imagine when talking about Black futurities. And it certainly is not the cyborg body that I inherited.

1 **'Prolactin stimulates milk production, whereas oxytocin initiates labor and triggers milk ejection during nursing. These same molecules, interacting with dopamine, also activate specific neural pathways to motivate parents to nurture, bond with, and protect their offspring. Parenting in turn shapes the neural development of the empathetic infant brain.' - *The biology of mammalian parenting and its effect on offspring social development*, James K. Rilling and Larry J. Young (2014)**

2 **'All I knew was I had to get my milk to my baby girl. Nobody was going to nurse her like me. Nobody was going to nurse her like me. Nobody was going to get it to her fast enough, or take it away when she had enough and didn't know yet.'Beloved, Toni Morrison**

Curated A Parede

Lucas Odahara
Author

Deceleration Recipe
Project

2016
Year

#recipe
Format

#alchemy
Theme

#smooth
Action

A powerful deceleration mixture of dough and technobody. Eat while still warm

1/3

DECELERATION RECIPE

'...we teach deceleration. and that's just your body's ability to not only accelerate itself but we gotta be able to stop. we need to be able to decelerate.'

'Delta V and delta t: Our velocity has both magnitude and direction. So this implies that acceleration too has both magnitude and direction. So whenever we specify our numerical value for acceleration, we also have to specify in which direction our object is accelerating.'

Make sure your computer display won't sleep. On the first 20 minutes of the process your fingers won't be able to touch screens or track pads – at least not in a responsive way. So you may adjust your display configurations by going to System Preferences, Energy Saver, and set the amount of time after which both your computer and display would sleep. Set it for Never.

Please check if you have all the ingredients. If not, make a screenshot of this text on your phone and go to the closest grocery store. You may also consider taking the chance and knocking on your neighbor's door. The handsome one that smiles at you when you see him/her at the hall, the one that holds the door for you when seeing you clumsily arriving with a bike, and the same one that does not judge you when he/she meets you on early mornings, as he/she is going out for a run and you are obviously coming back home, drunk – your handsome neighbor smiles at you on the same handsome way as always. If that neighbor does not exist, go to the closest grocery store. Before doing that, make sure you leave your computer charging. Mobility along the process is essential.

With all the ingredients and your sleepless computer ready, consider carefully what you will have on the screen during the first part of the process. As you will later notice, you will gradually grow awareness of your own body when mixing the dough. This will happen slowly, when you are reminded of your physical relation to the information on your displays. It may happen, for instance, when you remember that talk on YouTube your friend recommended to you and realized that you could have used the time you are mixing the dough to watch it, or when you thought this would be a great time to FaceTime with your mom and catch up (nothing would make her happier than doing that while watching you bake). All these uncontrollably accelerated thoughts will invade your mind, and they will be taken directly to your fingers, which, covered with the gooey mixture of deceleration, will remind you of the temporary incapability of your body to communicate with the computer, the phone, or the tablet. You will be forced to decelerate. And you can't stop mixing the dough.

Preparation

Take a bowl, fill it with half the amount of lukewarm water and pour in the yeast. Let it rest for 8 minutes, while you prepare another bowl with the flour, salt, and sugar. Use these minutes also to make sure both the recipe and any adjacent window is visible on your display. And make sure that you can scroll the recipe for the next hours by using only the up and down arrows. Tip: if you updated your system recently (Mac users), you may click and hold on the enlargement button of the browser in which the recipe is. This will split the screen in two, and then you can decide what will share the screen with the recipe. I put together this YouTube playlist for your adjacent window.

Now mix the yeast solution together with the flour and slowly stir it. Gradually add the rest of the water, and mix it with your hands. Now during this time of physical distance with your gadgets, you'll be steadily getting slower. Mix it for twenty minutes. Or better yet, make it two hours. Deceleration does not bake easily if not properly mixed. You will realize that now that you are a body, with your fingers full of deceleration mix, you are not able anymore to make contact with your gadgets, as I warned you before. Don't worry, one is never fully aware of the impact of this amputation. It's like the last time you've been to the airport, when passing through security control, after placing your bag on the scanning belt, taking your computer out, emptying your pockets inside the tray together with the little plastic bag full of your precious 100ml liquids, so that you could pass through the deceleration portal, as a new person, as a body. Because that's what you are being asked there. To turn into a body again. Deceleration does not need much else. You drink all water from your bottle, before passing through the gates. Liquids are not allowed. You are liquid. Keep on mixing the dough, and don't worry, the deceleration mix will eventually stick out of your fingers and have an existence of its own. You may have your body back after you are reminded of its existence.

'using my body weight to change directions wherever I wanna go'

Keep on mixing. Last week I flew to Brussels. The bombing at the airport had happened exactly six weeks before, and the place was now open and running with some structural changes for those that depart from there. Apart from the heavy presence of the army around the facilities of the airport, and the military vehicles sleeping in the parking lot behind covered plastic panels, passengers must walk through a labyrinth of provisory plastic tents, filled with concrete walls and attentive body scanning. It's a long process – the deceleration of the European capital. It starts with an email from the airport requesting passengers to arrive three hours before departure, followed by hours in queues, controlled distance from gadgets and special attention to water bearing and consumption. Again, I remind you that the balance between being well hydrated and keeping the distance from the new provisory toilets is of extreme importance. You are less passive than you imagine in this ritual. When decisions are being made in your behalf, when recipes are being installed in your every movement, you are responsible for focusing on your body. Will you throw away your water bottle before passing through the scan, or will you drink it all at once? The deceleration mix is all about liquid balance. You may add flour and water to the mix as much as you can, as long as the balance is achieved, and your body is its best witness. A balance of components preventing complete stagnation and also uncontrollable flow. How many concrete walls may fit in a plastic tent, in order to decelerate but maintain constant movement?

While waiting in queue for the scanning at the airport in Brussels and running through a list in my mind of procedures I'd be soon asked to perform, focusing on my pockets, my water consumption, my skin color, the size of my belt's buckle, my passport, slowly becoming a body, it was hard not to think about the possibility of a bomb, and how that, even more effective than the scanning ritual, would decelerate the whole queue. As bodies in danger, slowly trying to be sure your body is intact, we would have to look for new directions. The abrupt interruption of life would force it to be reprogrammed, decelerated, recalculated.

'acceleration simply tell us how quickly or slowly an object's velocity is changing. (…) deceleration is when the acceleration is negative.'

'The important concept that we are gonna go right now is deceleration. This is very important whether you are dealing here with seniors, youths, professional athletes, recreation athletes, 9 to 5 workers, you name it, everybody needs to know how to decelerate, change directions throughout their day, sports or activities whatever it may be. So here is a great drill to actually work on just that.

'The more you can fill your body with the goodness, like just the quicker you're gonna repair after exercise, the more astute you gonna be in fast reactions, your muscles and your bones density will be at optimal levels'

A bomb must happen where acceleration can be most affected. As a mechanic drill to change directions abruptly, if the environment around it is not physically ready to follow the deceleration process, injuries can be fatal – complete stagnation is possible, and positive acceleration may take longer than expected. The intention of the bomb was never to stop, just like the airport's control isn't. They are different drills of deceleration aiming towards flow in movement, but towards a new direction. And on these traumatic moments, all we have is our bodies, going from Berlin to Mallorca, from home to being deported back home, going from liberal to conservative, from democracy to dictatorship, from my control to your control.

After you've met the ideal water balance of the dough, when it's becoming a body of its own, while at the same time releasing yours, you must let it rest. Cover the bowl with a kitchen towel and let deceleration grow. Almost unnoticeably it will grow twice as big. One can usually hardly tell the consequences of deceleration at first, its intentions. The new directions it takes when released in a new protected environment as a body on its own and it starts again to accelerate. Feeding from the air around it, it will take everything for its own purposes until its structure has been formed. It's up to the one that engages on the deceleration process to understand the correct time for its perpetuation. Now it is not a question of water anymore, but once you pass through the gates and the aircraft takes off, when air is all there is, the amount of it that is taken will be one of the premises to define the new destination, the conditions of landing, and your own new shape. Don't forget to breathe.

Preheat the oven at 150 degrees Celsius. Accelerating again should be done carefully. Place the dough in the oven. You may check your emails again, but keep in mind that you are still a body and can't leave the house before the deceleration is complete. You are responsible for deciding when it is complete. Maybe you get it wrong at first, it takes experience. But keep in mind that any kind of deceleration recipe is traumatic. Changing direction is not easy, but the history of baking proves it must happen. Keep practicing, maybe you grow better judgment.

Eat while still warm.

Quotes from:
Joan Roth. *Deceleration Mechanics Drills* – HFPN – Health & Fitness Provider Network
AK LECTURES. *Average Acceleration and Deceleration*
Jamie Oliver. *Super-Food Protein Loaf / F2 Freestylers & Jamie Oliver*
Coach PJ Nestler. *Deceleration Drills*
Ultimate Sandbag. *Improve Functional Fitness with Deceleration Strength*
StormChasingVideo. *Airport Security Footage – September 2006. Minneapolis International Airport*
strenghtspeedagility. *Explosive Change of Direction Progression / ACL Injury Prevention*
Joe Bonyai. *Explosive Change of Direction and ACL Injury Prevention.wmv*
(Youtube Playlist '*Deceleration, by Lucas Odahara*')

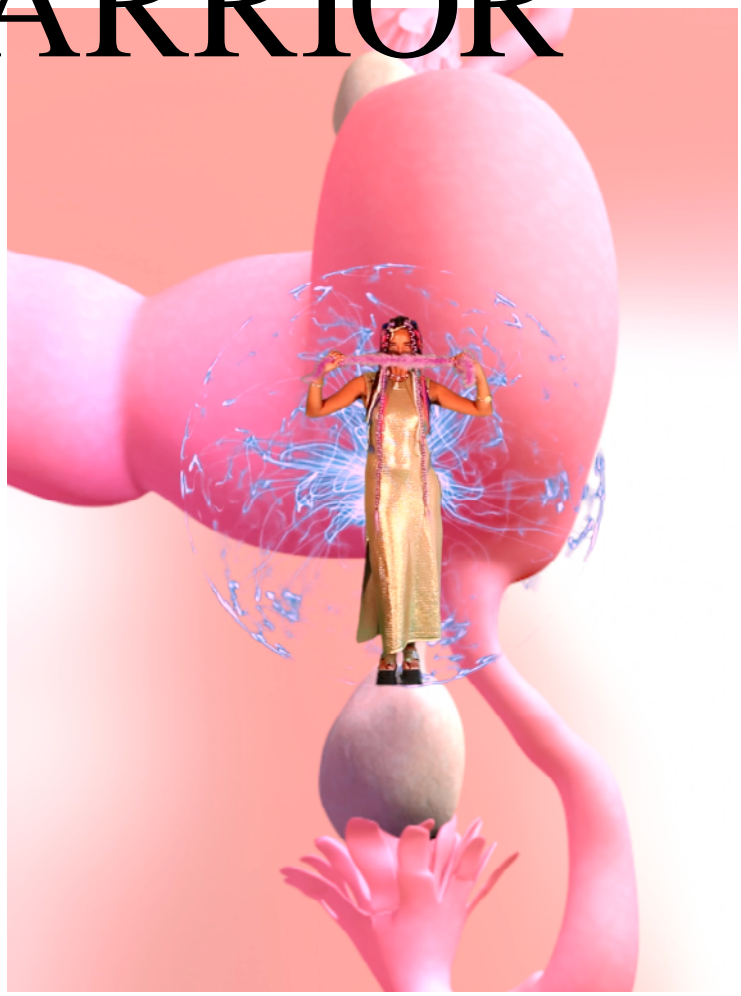
Curated A Parede

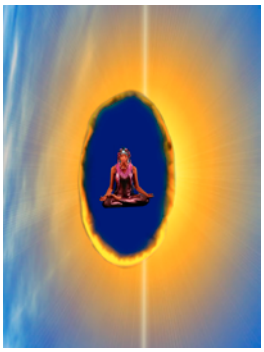
Tabita Rezaire	Peaceful Warrior	2016
Author	Project	Year

#recipe	#alchemy	#remesh
Format	Theme	Action

A decolonial self-care-preaching tutorial urging people of color to connect with their ancestral knowledge and traditional philosophical wisdom

PEACEFUL WARRIOR





From Kemetic yoga, meditation and womb movements to a decolonial diet, Peaceful Warrior provides survival tools to heal our traumatic genetic memory. This radical self love aims to build a spiritual community for a more efficient struggle.
Ankh Udja Seneb.

Welcome into my world, a world where we are not affected scared nor hurt. Where we do not care about white supremacy, homophobia, transphobia, fatphobia, misogyny, patriarchy, ableism, ageism… where all those subtle institutionalized and pervasive oppressions do not matter.

How to become

* Decolonial self care *
We shall invoke the power of the sacred serpent and connect with our ancestral knowledge… the serpent as a symbol of fertility, rebirth, guardianship, poison or healing, vengeance and wisdom.

* Kemetic Yoga *
Practice Kemetic yoga, the African spiritual healing and regenerative technology given by our ancestors from Ancient Egypt.

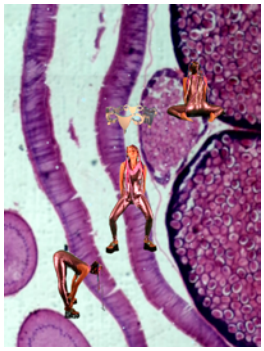
* Meditation *
Meditate and train your mind to reach a higher state of consciousness to access hidden pluridimentional realms. Breath deep… Allowing for a metamorphosis from an angry warrior to a peaceful warrior.

* Womb power *
Release your yonic power through womb movements and unapologetic pride.
Pussy booty magic

* Decolonial diet *
Decolonize your diet. Food is medicine for your mind body and spirit, it is a spiritual connection to our histories, ancestors and land.
Bless the earth for plant based healing.

* Radical self love *
Put on your power outfit and shine Bright like a diamond. I'm feeling myself.

Holistic Healing
Qtipoc love



Peaceful Warrior Video

BREAKING DOWN THE WALLS WITHIN

1/2

We found the instructions on a blog.
We used:

- 1 glass jar
- 1 rubber bathtub/sink stopper or a metal screw-on lid that fits in the jar
- 1 syringe
- 1 one way aquarium valve
- 1,5 meter of plastic aquarium tubing
- caulk
- speculum
- 1 flexible plastic cannula (the thin plastic tube found on spray bottles)
- x-acto knife

The Unborn is a human being that has been conceived, but not has yet been born. The Unborn holds full personhood rights. The concept of the Unborn also includes human beings conceived "in vitro", even before transference to a woman's uterus.

We started by preparing the jar: fitting the rubber stopper, then carving two holes on each side with the x-acto knife. The holes must be just large enough for the tubing to fit; I carved them by touching the tip of the knife to the stopper and then twisting the knife while applying some pressure. We cut two sections of tubing around 50 cm in length and fitted them into the openings. We applied caulk to the openings to make sure that there wouldn't be any air going into the jar.

A woman who provokes an abortion on herself or who consents that others provoke it shall be punished with one to three years of imprisonment.

We fitted the one-way valve to one of the pieces of tubing. As the blogger said, you must mind the direction of the valve. There's usually an arrow in the valve pointing to the direction in which the liquid will flow. We couldn't find the arrow in ours, so we just blew through it to see in which direction did the air flow. In our final object, we want the liquid to flow towards the jar.

We placed one more short section of tubing (10 cm is enough) on the other end of the valve and then fitted the spray bottle cannula on that end.
We finished the object by fitting the syringe into the other piece of tubing coming out of the jar.

To induce, to help or to instigate a pregnant woman to practice abortion, or offering any service for that purpose, shall be punished with six months to two years of imprisonment.

We wanted to reclaim something that was ours but had been stolen. We wanted to write our own Constitution, to break down walls within our bodies. Walls that prevented us from accessing those recesses, walls that made us incomplete.

Those who sell or provide, even if free of charge, a substance or object designed to provoke an abortion shall be punished with six months to two years of imprisonment. The same punishment applies to those who instruct or guide a pregnant woman on how to perform an abortion.

Those who announce a process, substance or object destined to provoke an abortion shall be punished with six months to two years of imprisonment.

There could be complications, of course. We needed to be careful – not only with our bodies when trying something like this, but also with whom we shared this information with. We could get arrested, prosecuted,

and imprisoned. We wanted to understand how to do this in order to share this knowledge with others, but this is exactly what could land us in jail. There could be informants, undercover police, I'd seen it happen. We couldn't even give out information about this openly; this could also land us in prison.

> *Healthcare professionals are not be obligated, in any context or case, to prescribe, administer, or offer information about a procedure or medication that they consider abortifacient.*

We couldn't ask around, maybe go to a trusted doctor and casually wonder about how this procedure is performed. It had to be absolutely hushed. Only those directly involved could know.

> ***Decree 463/2018***
> *The commercialization of plastic tubing, caulk, hydraulic valves, syringes and other materials used to build abortive devices is restricted to licensed stores. Purchase of these items is restricted to registered parties.*

Anonymous, Emilia Yang and Biayna Bogosian
Author

DIY / DIWO Transgressive Abortive Methods
Project

2016
Year

#methods
Format

#resistance
Theme

#bridge
Action

DIY / DIWO TRANSGRESSIVE ABORTIVE METHODS

A Q&A BETWEEN THE PROJECTS 'BREAKING DOWN THE WALLS WITHIN' AND 'MARIAS CLANDESTINAS'

Motivations and inspirations:

Marias Clandestinas: Our main motivation stems from the fact that we come from countries where there is a wide spectrum of legality and access to abortion. In some places even it is legal, access is so limited that it is almost as if it were illegal. Overall, motherhood of Latin American women and women in general, often occurs in contexts of poverty and marginalization, while people who have money are able to buy reproductive health options. We also see a wave of conservative politics everywhere that are using technology to advance their agenda (for example, the 'pro-life' activism 3D printed fetus)[1]. We were also deeply inspired by the Jane Collective who were a group of women in the 1960's that created a network of underground abortion services, as well as the GynePunks who are currently assembling an arsenal of open-source tools for DIY gynecological diagnosis.

Breaking Down the Walls Within: for me it's really interesting to think about how the spectrum of legality for abortion is so nuanced – from places where late-term abortion is permitted, to places where even miscarriages are investigated and everything in between. I come from a country where abortion is only permitted in a handful of very specific cases: rape, risk of death for the parent, or in case the fetus suffers from anencephaly (a serious malformation that causes death within hours of birth). Currently there are a number of bills under consideration in the National Congress that, if passed, would overturn even these small victories. One of these bills determines that life begins at conception; this would not only completely abolish abortion rights: it would possibly make things like the IUD or the morning after pill illegal. This is just a single example of what is going on throughout the world in terms of abortion rights. Sometimes it's difficult, if you live in a place where abortion is legal, to realize how many people don't have access to this basic human right.

Women bodies' (control and choice):

MC: We believe that the modern woman should have all the right to make decisions about her own health, body, sexuality and reproductive life, without fear, coercion, violence or discrimination. But, all over the world women's freedom to make these decisions is controlled by the state, medical professionals, and families. Criminal law and punitive sanctions are used by these institutions to control such choices. Anti-abortion laws are a key form of maintaining maternity as the thing that defines women. Historically, women have fought to regain power over their bodies through collective action; but their efforts have been effectively pushed back, leading them to seek more radical alternatives.

BDWW: Motherhood, particularly in patriarchal and western/ized societies, tends to be seen as the sole responsibility of women, a solitary endeavor; sometimes it's even referred to as a punishment for a woman who has dared to have sex. In contrast, some societies consider the rearing of children to be an endeavor for which the whole community is responsible. This approach distributes a labor that is otherwise (that is, in western/ized societies) perceived as pivotal to

1 See the 3D-printed fetuses that could perhaps change the abortion debate

defining the social position of 'woman'. Of course, it's easy to overly simplify what is a much more complex issue, and assume that the distribution of this labor solves the problem of patriarchy and sexism. It doesn't, of course, not by itself. However, it is a key part of the problem, and one that also needs to be addressed. I see this issue as very connected to abortion rights: it is essential that people born with uteruses cease to be perceived as walking incubators in order for societies to be able to approach abortion from a more honest perspective.

Abortion and #additivism:

MC: With our proposal we considered the implications of thinking of abortion as an additive process (small and incremental steps towards self-sufficiency) which could be tackled in different ways. Similar to many additivists, we are working with devices/practices that are challenging techno-scientific and socio-political boundaries. We want to use the affordance of 3D files to travel without respecting borders, and penetrate parts of the world that others forms would not be able as well as circumventing certain laws that for us should not exist because they are based on patriarchal or religious notions.

BDWW: While researching how abortion and contraception are performed outside of the contemporary scientific/medical establishment, one thing that becomes clear is that these are things that humanity has always needed. All societies have had to develop their own forms of fertility control using what was available; some of these societies were more successful, some less. Some methods were (and are) safer, some are riskier. Abortion can be, as they said, understood as additive in nature, in a process that mirrors the ways in which indigenous knowledge is constructed: through an infinite number of small steps, through knowledge passed down by generations.

Safety and care:

MC: Physical safety and arguments about the morality of abortion have been the main scare tactic for the opponents of the practice. 3D printing is part of DIY (Do It Yourself) culture that promotes self-sufficiency. However, instead of the DIY methods, we support the idea of DIWO (Do it with Others) abortive methods because we consider possible complications and the intense process that it can be. This methods highlight the importance of supportive networks, shared knowledge and resources. We also proposed that the speculum and the vacuum would become 'sensible' i.e. smart objects with displays that aid the process according to the data retrieved by the object.

BDWW: My piece is about putting together a contraption that allows you to perform an abortion with things you can easily find in any department store. It is not intended as a set of instructions, or a recipe, on how to perform the abortion itself: it is a reflection about how, even in places where the law prevents you from accessing an abortion, it is possible to figure out ways to circumvent these restrictive laws. It also begs the question: how far are legislators willing to go in order to restrict our right to determine what happens to our bodies? Even our freedom to speak about it, to offer information about abortion is restricted; will they start banning household items now, too?

Most anti-abortion legislation penalize the doctors and women who perform it. How do we protect those involved?

MC: In our proposal we are tapping into already existing incognito networks that have been operating under the radar for years. We are also adopting the main principle of these hidden networks which is maintaining the anonymity of everyone involved. Furthermore, the malleable nature of materials utilized in the process of 3D suggest ways of disposing and recycling the materials used in the abortion, all which would prevent tracing any identities.

BDWW: As they said, there are underground networks in several places that help people in need of abortions. Sadly, those working within these networks operate at their own risk; getting arrested is a constant and real possibility. This is why trust and anonymity are so important for these networks; this is why, when communicating over the web, a specific kind of lingo is sometimes used to refer to abortion and related procedures; this is why we create our own channels to communicate; this is why, sadly, conversations about this need to be private.

Material resources and feasibility:

MC: The reality is that abortion laws are the most strict in countries that are also economically challenged. What we would like to think is that those who are interested in the practice can learn to use the printer and their technical knowledge becomes the source of power. Therefore, in our proposal we include the instructions to build a DIY 3D printer as part of the resources. The other option is to rely on online 3D printing services that connect individuals to a network of 3D printers with experts to overcome the lack of technological and material resources of their environment.

BDWW: This is a very immediate issue, and it is why I decided to attempt building the device from things that can be found in department stores. It is not the ultimate, nor perfect, answer to the lack of access to abortion; as I said before, my piece is meant as a demonstration that it is possible to work around restrictive laws with the intent to, ultimately, change them.

The affordance of speculation:

MC: We believe that we are engaging in a practice that requires freedom and privilege. We acknowledge our privilege as researchers/designers/artists but see ourselves as allies to million of women who have to go through this process. We aim to design in an informed manner, taking into consideration real situations, people and practices that make our proposal grounded in a social reality. We see speculation as an opportunity to dream possible solutions for real world scenarios and push the boundaries of current ideologies and practices.

BDWW: Many speculative proposals and scenarios speak from a position of privilege, to a position of privilege, through privileged means and in privileged spaces. In speculating about ways to break or circumvent restrictive laws, we can imagine how things might play out, what kinds of resistance strategies might emerge as responses to unfair systems.

BROWNTOURAGE *CURATORIAL STATEMENT*

SUBALTERNATE REALITIES

1/2

CURATED BY:

*Hawa Arsala and
Tonia Beglari
(Browntourage)

LIST OF PROJECTS:

- Emilia Yang and Biayna Bogosian: Marias Clandestinas
- Lishan Amde: The Ring
- Shushan Tesfuzigta: Women of Medri Bahri
- Symrin Chawla: BLOOD BATH™
- Sofía Córdova: Hydrodynamic Vessels Production Catalog

Design does not exist in a vacuum. A designer conceptualizes solutions for a specific time, place, and, most importantly, lifestyle. Subalternate Realities focuses on post-colonial, non-western, queer, and/or feminist frameworks of additivist production. With the goal of centering marginalized lifestyles, Browntourage prompted artists from radical backgrounds to take on the role of industrial designer and imagine how a specific communities outside of the mainstream would function within a specific speculative future. Each artist designed an artifact that the community would use in said future. Presented through archival media from the future world itself, the final works featured in Subalternate Realities raise a wide array of issues regarding accessibility, sustainability, pleasure, and biopolitics. By tapping into the subaltern consciousness to layer new realities, we hope to manifest a ‘history from below’ where #additivism engages the critical imagination.

Emilia Yang and Biayna Bogosian	Marias Clandestinas	2016	#toolkit	#resistance	#bridge
Author	Project	Year	Format	Theme	Action

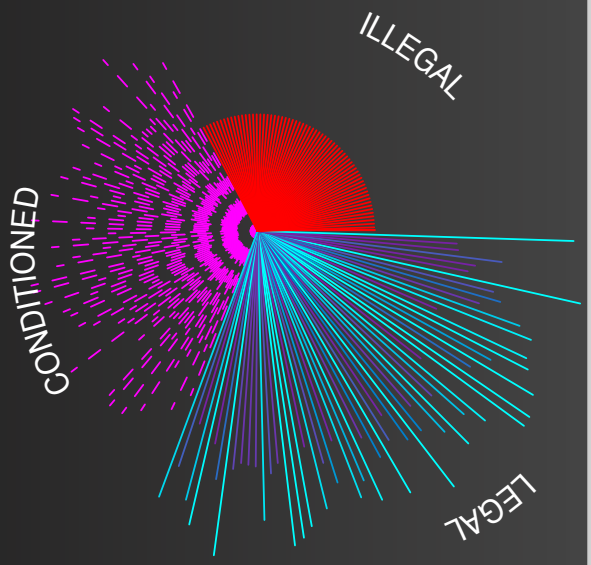
Proposals for open source 3D printable abortion kits

MARIAS CLANDESTINAS

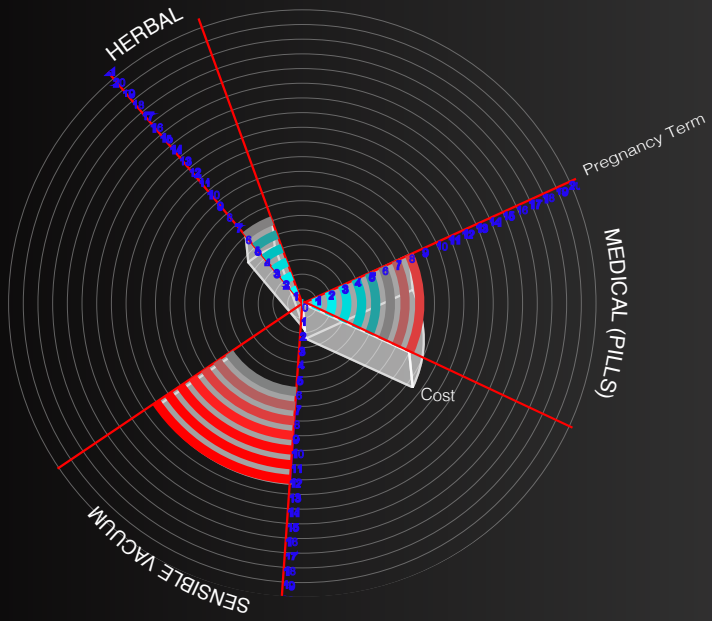
CLANDESTINE **DIY (WITH OTHERS)** ABORTION KITS
IN THE FUTURE THERE WILL BE CHOICE...

ABORTION BY COUNTRIES IN 2016

Other factors: safety, accessability, religion, social restrictions



ABORTION METHODS



Success rate
0 50 100

1/2

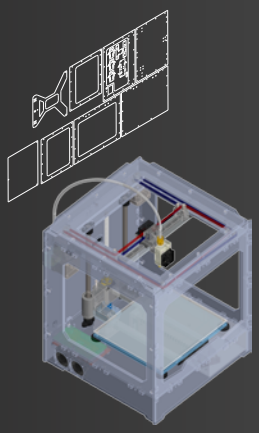
- 3D Printer
- Sensible Speculum
- Sensible Vacuum
- Recycling Methods

- Information
- Tutorials
- Cases & FAQ

- Your network
- Support groups
- Other Collectives
- Volunteer

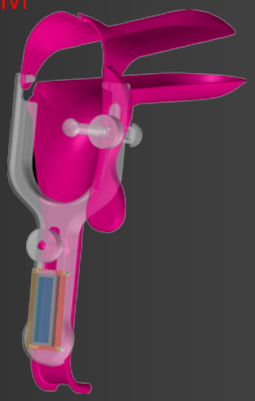
3D PRINTER

This file includes the fabrication material for the 3D printer



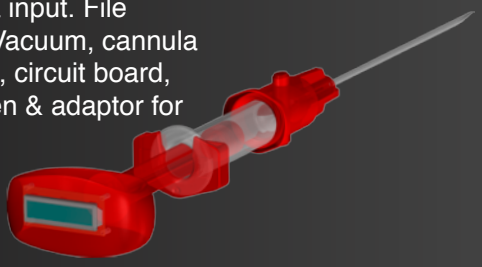
SENSIBLE SPECULUM

Interface displays dilation, temperature, pulse, blood pressure, and suggested cannula sizes. File includes speculum LCD screen & circuit board.



SENSIBLE VACUUM

Interface displays amount of removed blood according to data input. File includes: Vacuum, cannula (4-12 mm), circuit board, LCD screen & adaptor for cannula.



All products are sensible, free, safe, effective, portable, easy to use, reusable, and quiet
Soon to come: 3D printed IUDs (Intra Uterine Contraceptive Devices) and DIY ultrasounds

Curated Browntourage

Lishan Amde	The Ring	2016
Author	Project	Year

#device	#figures	#replace
Format	Theme	Action

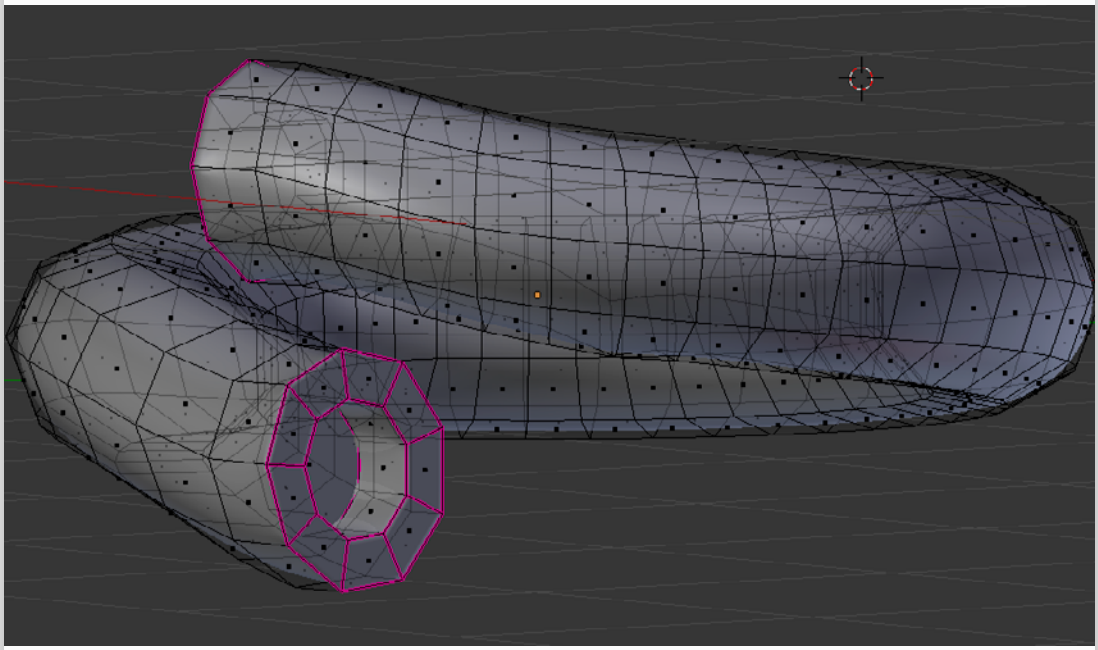
Artifact to replace wedding rings for non-hierarchical, polyamorous, queer relationships among unmarried individuals (both humans and non-humans)

THE RING

21:07 83%

If They Come in the Morning

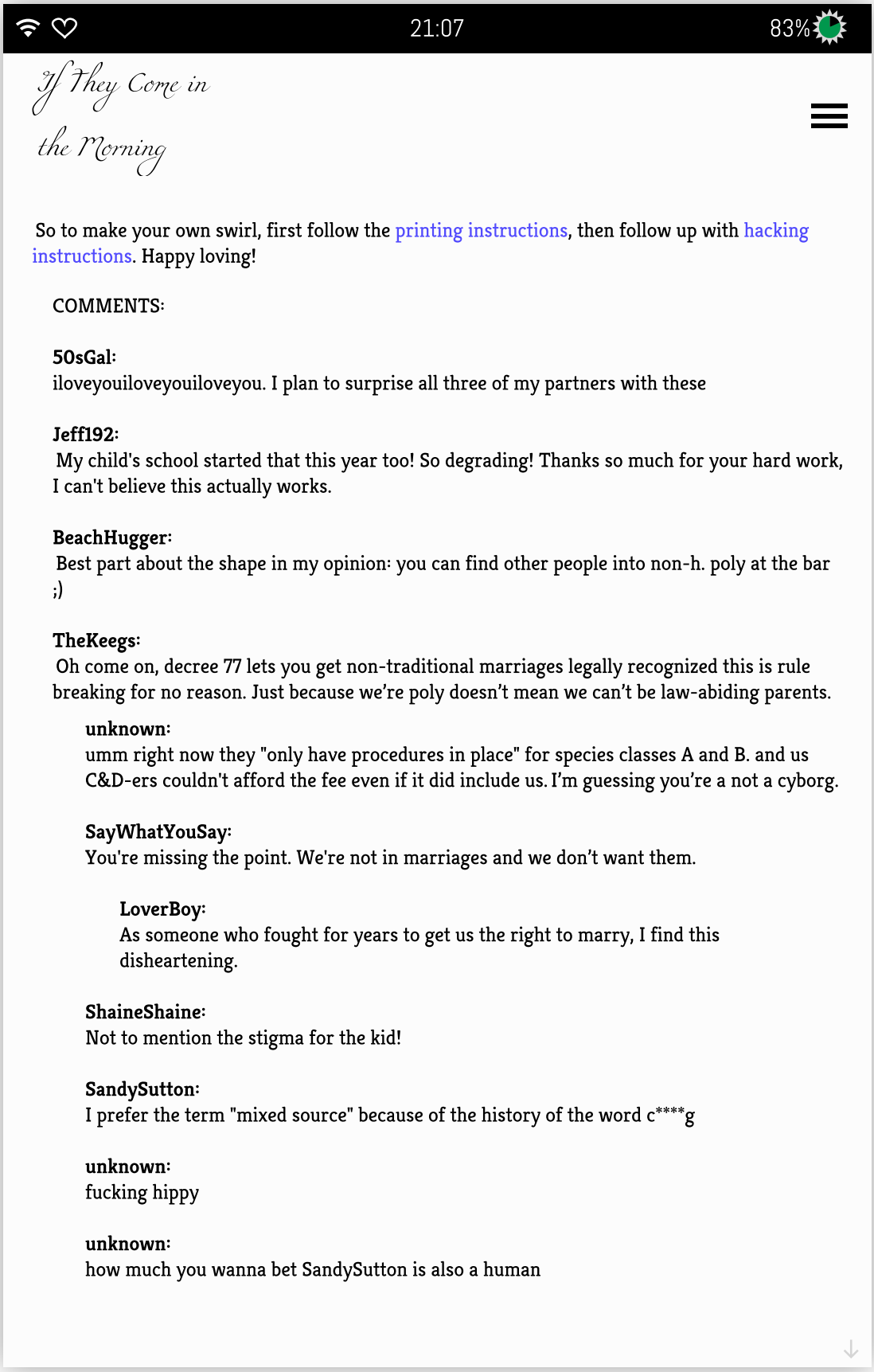
Poly-Negress:
Yesterday at 18:09



Hey guys. Like many of you, my daughter's school recently switched to integrated identification for parents, and me and my nesting/rearing partners (we all have the chip) aren't down to decide/label which two are the "real" parents. So my daughter and I printed these knockoff rings and figured out how to make them mimic the real thing. So far we have them working for up to four-way rearing partnerships, but I'm sure someone can figure out how to get the number higher.

It's actually not technically a ring. We left the edges open so that you can connect to other rings for other partnerships, and it's smart enough to know which ring you're trying to use on each form. This was my daughter's touch (I think she's hoping I make rearing commitments with my current non-serious girlfriend haha). The communication between rings works pretty well as long as you snap them into place. If you have a bunch of partnerships, you'll get a swirl going up your finger.

Anyone is welcome to use this, but we created it for people in non-hierarchical polyamorous relationships who, like us, don't believe in marriage. Integrated ID for parents makes life so difficult for us, and we're tired of having to explain our "deviant" home situation to teachers and other parents.



So to make your own swirl, first follow the printing instructions, then follow up with hacking instructions. Happy loving!

COMMENTS:

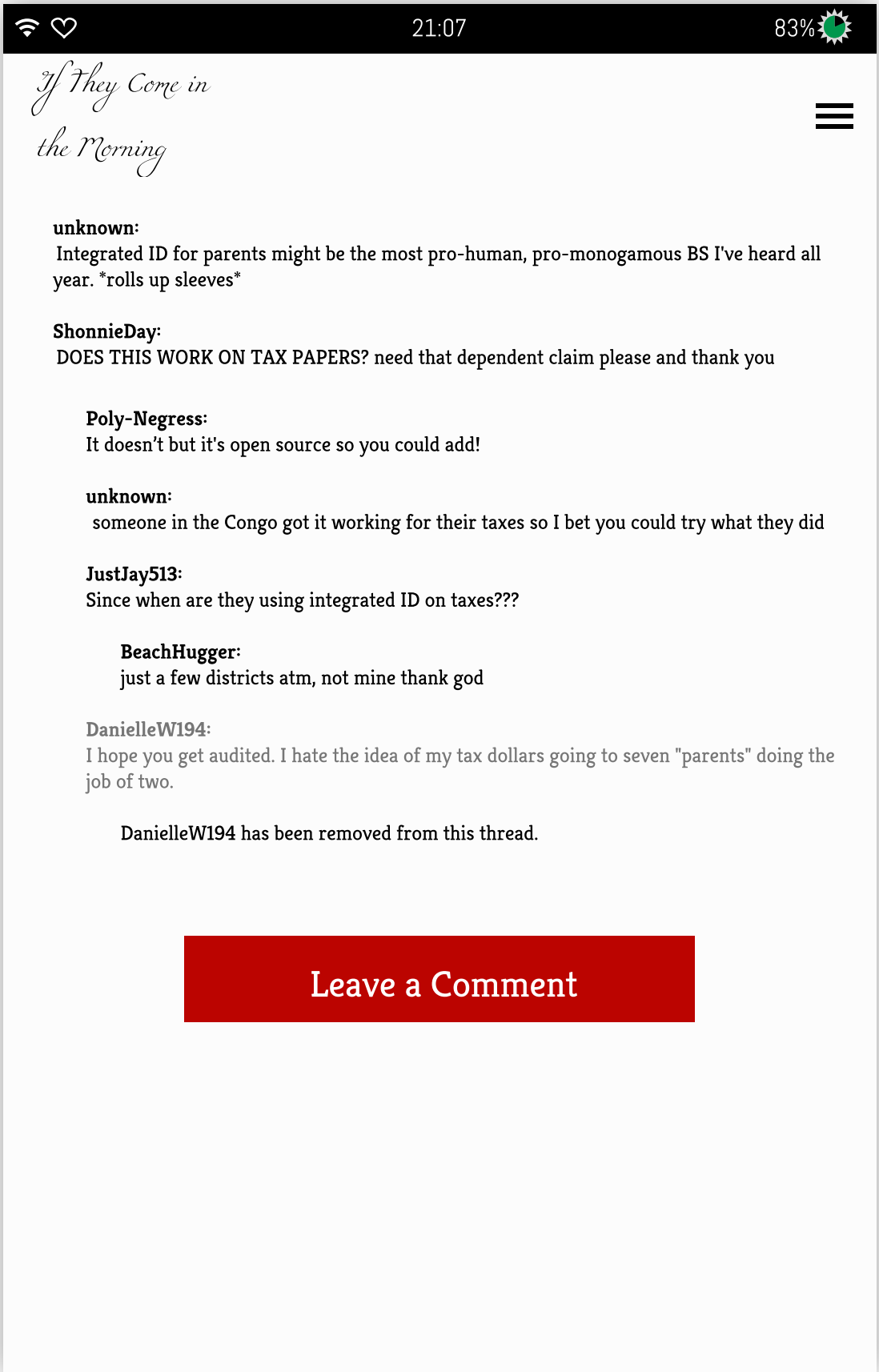
50sGal:
iloveyouiloveyouiloveyou. I plan to surprise all three of my partners with these

Jeff192:
My child's school started that this year too! So degrading! Thanks so much for your hard work, I can't believe this actually works.

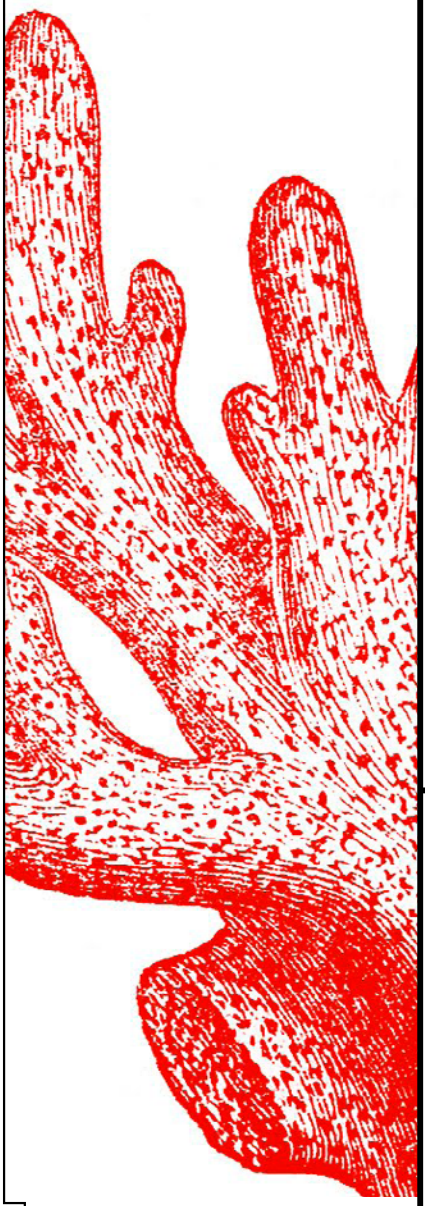
BeachHugger:
Best part about the shape in my opinion: you can find other people into non-h. poly at the bar ;)

TheKeegs:
Oh come on, decree 77 lets you get non-traditional marriages legally recognized this is rule breaking for no reason. Just because we're poly doesn't mean we can't be law-abiding parents.

> **unknown:**
> umm right now they "only have procedures in place" for species classes A and B. and us C&D-ers couldn't afford the fee even if it did include us. I'm guessing you're a not a cyborg.
>
> **SayWhatYouSay:**
> You're missing the point. We're not in marriages and we don't want them.
>
> > **LoverBoy:**
> > As someone who fought for years to get us the right to marry, I find this disheartening.
>
> **ShaineShaine:**
> Not to mention the stigma for the kid!
>
> **SandySutton:**
> I prefer the term "mixed source" because of the history of the word c****g
>
> **unknown:**
> fucking hippy
>
> **unknown:**
> how much you wanna bet SandySutton is also a human


21:07
83%
If They Come in the Morning
unknown:
Integrated ID for parents might be the most pro-human, pro-monogamous BS I've heard all year. *rolls up sleeves*
ShonnieDay:
DOES THIS WORK ON TAX PAPERS? need that dependent claim please and thank you
Poly-Negress:
It doesn't but it's open source so you could add!
unknown:
someone in the Congo got it working for their taxes so I bet you could try what they did
JustJay513:
Since when are they using integrated ID on taxes???
BeachHugger:
just a few districts atm, not mine thank god
DanielleW194:
I hope you get audited. I hate the idea of my tax dollars going to seven "parents" doing the job of two.
DanielleW194 has been removed from this thread.
Leave a Comment

WOMEN OF MEDRI BAHRI

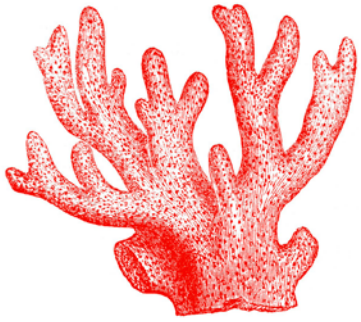


Authored by Shushana Negisti, 2023 Eco-Feminist, Historian, Afro-Futurist Designer, Keyderati

Medri Bahri (formerly Eritrea, which was formerly Medri Bahri) a utopian land for women by women. Once coined the North Korea of Africa, Medri Bahri is now a leading example of how technology, craft, and design can be used to catapult societies into an equitable and just future. What happened when Medri Bahri women were given economic power? Medri Bahrian women responsibly decided how their culture was produced, exported, circulated. Thus beginning the true Golden Age of Eritrea.

Boon Ab Semai Festival, 2016
On May 24, 2016, those who stifled the potential of this ancient city by the sea were sent into the sky on state of the art space pod. Fueled by boiling Medri Bahri coffee brewed in traditional coffee pots (Jebenas) passengers were accompanied with a lifetime supply of audiobooks on The State of Eritrea 330AD – 2013AD & Injera to keep them bloated for the rest of their sorry lives. For the entire day, Medri Bahrian women filled the streets singing, dancing, and throwing popcorn in celebration.

Dekemhare Center for the Advancement of Craft & Design, 2018
The Dekemhare Center for the Advancement of Craft and Design (DCACD) is credited for bringing in innovative designers/ architects from around the world to create and prototype products and systems that instrument freedom. Giving the Medri Bahri people the tools to empower themselves. The center also launched a sister center in the Port of Massawa to develop the potential of using salt as building material for architecture. Inspired by the 3D printing company Emerging Objects in Oakland, California and the traditional use of coral as natural cooling system, the Massawa community began an architectural restoration project to clean up the buildings that were damaged during the Eritrean War for Independence.



Another composite material the DCACD made recipes for used coffee grinds. Which was used to replace “traditional” ceramic coffee cups that were being made in China. Linking the Medri Bahri coffee ceremony to regenerative design.

Another notable recipe used bio waste from the Teff fields and all recipes can be purchased at local markets.

Medri Bahri Conference, 2023
Today in 2023, thirty years after Medri Bahri was declared an official country by the United Nations, the capital city of Asmara is planning to host the first conference of its kind celebrating the accomplishments of Medri Bahrian feminist intellectuals. Keynote speakers including myself- afro-futurist designer Shushana Negisti, activist Meron Estafanos, and film producer Zeudi Araya, and film producer Zeudi Araya will be attending.

Curated Browntourage

Symrin Chawla	BLOOD BATH™	2016
Author	Project	Year

#device	#sense	#smooth
Format	Theme	Action

Customized soap-dildo for one time use

Blood BATH™

IN TH
THE
OF DA
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OBJEC
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HE GOLDENSEAL HERB HAS LONG BEEN USED IN AYURVEDA FOR GENTLE VAGI-
AL CLEANSING AND MENSTRUAL CYCLE REGULATION, WITHOUT DISTURBING
ELICATE BACTERIA AND PH . OUR REFINED MIXTURE OF GLYCERIN, GOLDEN-
EAL AND ROSEWATER CAN BE CUSTOM 3D PRINTED FOR IDEAL STIMULATION
URING SELF PENETRATION AND THROUGHOUT THE BATHING PROCESS.

UT THAT'S NOT ALL - SIT ON CAKE™ BELIEVES EVERY CLIMAX SHOULD END
ITH A SPLASH. SEND OUR LABS A 3 TEASPOON BLOOD SAMPLE FROM YOUR
ARTNER, LOVER OR TOY AND OUR TECHNICIANS WILL FURTHER CUSTOMIZE
ACH ONE TIME USE BAR WITH A NETWORK OF LIVING BIOPRINTED BLOOD
ESSELS CONTAINING THEIR NUTRIENT RICH NECTAR. AS OUR SOAP DIS-
OLVES INTO YOUR SOFT CREVICES, SO TOO WILL THE LIFE FORCE OF YOUR
OVER SEEP INTO YOUR VAGINAL PORES, OPENING UP DEEPER CHANNELS OF
HEMICAL COMMUNICATION.

LOOD BATH™ - BATHE IN THE ESSENCE OF YOUR BELOVED.

SIT
ON
Cake
INC
YOUR COMPLETE SOURCE FOR
BIO Divination

2/3

Blood

$90 PER BA

includes
BLOOD VESSELS

BATH™

Curated Browntourage

Sofía Córdova
Author

Catalogo de Producción de Naves Hidrodinamicas / Hydrodynamic Vessels Production Catalog
Project

2016
Year

#fabulation
Format

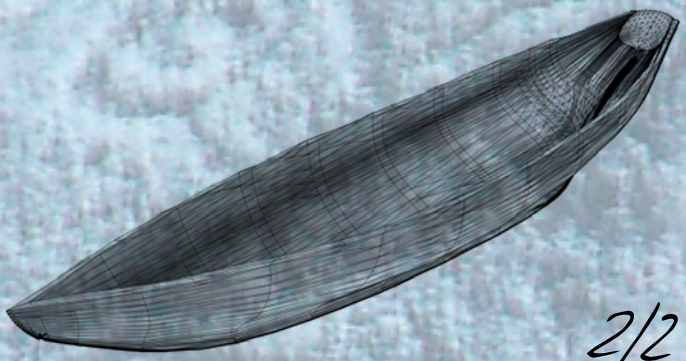
#outside
Theme

#detach
Action

Polycarbonate canoa to get around in a submerged world

CATALOGO DE PRODUCCIÓN DE NAVES HIDRODINAMICAS / HYDRODYNAMIC VESSELS PRODUCTION CATALOG

//2



2/2

These catalogs can be found at offshore 3D printing facilities located around our future earth, now largely underwater. To access these facilities you must first make contact via pocket homing devices - like a sort of radio-cum-dumb phone, they pick up visual and audio signals when in proximity to beacons they also can output signals themselves (think walkie talkie). The owners of these facilities arrange pick-up via motor boats and bring you over. Once there, you can select from various designs in the catalog for various amenities needed in this water world. The piece shown here is a quick but steadfast boat for one occupant.

This fast print, polycarbonate canoa is based on the ones used by the now exterminated Taino indians of Puerto Rico (Arawaks) for ease of travel around the flooded New Urth.

Each printable model comes with a plug-in protective spell of Oxúm, Nuestra Señora De La Caridad Del Cobre. While on water, you will run into no trouble, you will be invisible and fast.

Also included is a printable file for a short wave transistor for ease of communication and access to encrypted broadcasts, reports on radiation storms and the latest noticanciones bearing news of the various beligerancias (armed conflict from land-based rebel armies) near your area.

Suerte out there!
TRADE COST SAMPLE OPTIONS:

- 50LBS BLUBBER (ANY ANIMAL)
- LIVING CORAL (ANY AMOUNT)
- SEEDS (.5LB-1LB DEPENDING ON SPECIES-EDIBLES AND FLORALS HIGHER VALUE)

NEW BLOOD: THE 21ST CENTURY MANIFESTO

"IT IS HARD TO IMAGINE A MANIFESTO THAT IS NOT SIMULTANEOUSLY DESTRUCTIVE, THAT DOES NOT LEAVE BEHIND CRITICAL RUINS OF SOME SORT."

A Preamble Followed by a Few Tenets

I stayed up all night – me, myself and I – writing this essay under fluorescent lamps of filigreed aluminum …

As Martin Puchner observed in his book *Poetry of the Revolution* (2005), there have been 'repeated surges of manifesto writing' since the late nineteenth century. I agree with Puchner's claim, specifically in the case of the manifesto but also more broadly, that the avant-garde remains alive and well – not confined to an historical period. In fact I would argue that the present decade has seen an upswing in manifesto writing, and that since the second-wave avant-garde of the 1960s there has gradually evolved a new post-media incarnation of the genre. This renaissance is aided on one hand by a renewed spirit of activism and political engagement, in art and elsewhere, since 2008, and on the other with the spread of the Internet, particularly social media, into every corner of our lives – meme culture being a rich environment for the manifesto.

In October 2008, the very moment when the devastating extent of the financial crisis was being revealed, a 'Manifesto Marathon' took place at the Serpentine Gallery in London. The aim of the event – conceived by Hans Ulrich Obrist and subtitled 'Manifestos for the 21st Century' – was to address a moment of difficulty, a season of scarcity for the manifesto. Everyone was there, from to Brian Eno to Rem Koolhaas to Yoko Ono.

As fate would have it, however, it was at that very moment that the fortunes of the genre improved. This was due to an unlikely confluence of factors: the Manifesto Marathon coincided with scholarly activity, in the form of publications and exhibitions, marking the centenary of Italian Futurism (followed by a host of others, like this year's Dada centenary); social media was rapidly gaining pace; the financial crisis ignited in the US banking sector was beginning to catch fire in Europe and elsewhere; and, over the next few years, with Occupy and Anonymous and grassroots political movements responding to the crisis in Europe, radical politics returned to center stage.

The shift did not happen overnight. Speaking at the Manifesto Marathon in 2008, the novelist Tom McCarthy called the manifesto 'a defunct format. … The bombast and aggression, the half-apocalyptic, half-utopian thrust, the earnestness – all the manifesto's rhetorical devices seem anachronistic now'. And still in 2010, in 'An Attempt at a 'Compositionist Manifesto'', Bruno Latour states: 'the time of manifestos has long passed'. Latour links the manifestos of the historical avant-garde to a belief in progress – which in fact does not stand up to scrutiny if one considers Dada or Vorticism with their attack on ideas of progress and reason. But Latour's point sharpens as the essay goes on. He writes: 'And yet a manifesto might not be so useless at this point … Not as a war cry … but rather as a warning, a call to attention, so as to stop going further *in the same way as before* toward the future'. At last, a rallying cry truly suited to the 21st century.

And what about now, eight years on into the 'half-apocalyptic, half-utopian future'? Does it still seem so anachronistic and strange? 'The fear of being called anachronistic' – this is Puchner again – '… has not stopped artists and activists from writing different types of timely manifestos with impunity.' And McCarthy's dismissive remark was revealed afterward to be praise – he went on to explain that the manifesto's anachronistic aspect is the source of its interest and value: 'Things that don't work have great potential.' McCarthy's point is insightful, and it hints at the post-digital state of the manifesto – both cutting-edge and arcane. The 1999 'Stuckist Manifesto', for example, called for a return to analogue, figurative 'authenticity' (no doubt in reaction to the digital age generally as well as conceptual art in particular), while at the same time claiming to be 'the first significant art movement to spread via the Internet'.

Puchner doesn't regard the manifesto as defunct. He asks us 'to think of modernization … as different waves … each bringing with it new avant-gardes.' But even Puchner, writing a decade ago, could not foresee the next wave of manifestos caused by the genre's adaptation to the digital world and adoption by social media. Virality, memes and meme activism, the struggle to stand out and be heard amid the rising din of voices – a sort of amplified reenactment of the isms and schisms in the historical avant-garde – and at the same time the online proliferation of hundreds or thousands of new movements, not only in art and social activism but in business and tech and lifestyle, each with its own manifesto.

All of this signals a new 'manifesto moment'. I'll now try to sketch a quick description and genealogy of the 21st century manifesto, focusing on the transformative potential of the genre in post-media conditions – that is, in conditions where software has taken command, where everything is digital first, where medium has been overtaken by message, and where outmoded forms begin to project a new aura of redemptive potential.

Tenets

Most manifestos still adhere to the template passed down by Moses, Marx, and Marinetti – a preamble followed by a list of commandments or tenets, often numbered. This rigid structure has proved difficult for the post-media manifesto to shake, and of course there is no reason why it should – if anything, mainstream culture has finally caught up with the manifesto – *especially* the numbered tenets, which now resemble a 'listicle' as much as a declaration of principles.

Blast / Counterblast

Wyndham Lewis, the self-proclaimed 'Enemy' and leader of Vorticism, looked back in awe from the 1930s at the era before mass media: 'The Press in 1914', he wrote, 'had no Cinema, no Radio, and no Politics: so the painter could really become a 'star'. There was nothing against it.' The field, in other words, was wide open for young lions.

Skip ahead to the second-wave of the 1960s and the manifesto boom that accompanied it, and we see the coincidence of the new avant-garde with the dawn of the post-media age. This was a moment for the manifesto but also for Marshall McLuhan. An interesting line can be drawn from the Voriticist manifestos of *BLAST* in 1914 to McLuhan's late modernist homage to *BLAST* in his 1954 'zine' edition of *Counterblast*, and then to the second *Counterblast* of 1969. The second *Counterblast* is a post-media manifesto that describes the 'acceleration of evolution', technology replacing biology – anticipating the Accelerationism of the present decade.

Into the Digital

The manifesto had something of a wilderness phase or a lost generation between the second-wave avant-garde and the new energy of the Internet in the mid 1990s. One example is Neoism. The Neoist Manifesto of 1979, which is just a defaced, unreadable text, suggests that things had more or less run their course by the late 1970s. And almost two decades later, when Lars von Trier launched the Dogme 95 'Vow of Chastity' on red leaflets, the genre was clearly growing tired, relying on the ironic reiteration of (already ironic) first and second-wave avant-garde tropes.

There were exceptions, especially coming from the broadly feminist perspective – responding, as women have done since Mina Loy's 'Feminist Manifesto' (1914), to the masculinist model of Futurism. These include cyberfeminist and transhumanist manifestos like Donna Haraway's 'A Cyborg Manifesto' (1985/1991), VNS Matrix's 'Cyberfeminist Manifesto for the 21st Century' (1991), and ORLAN's 'Carnal Art Manifesto' (2002) – which anticipated more recent examples like 'The Riot Code Grrrl Manifesto' (2010) and 'The Glitch Feminism Manifesto' (2012).

Meanwhile a seismic shift to digital culture and the Internet was taking place. Beginning with 'The Hacker's Manifesto' in 1986, online manifesto writing expanded as new virtual communities – hackers, cyberfeminists, open source activists – used the genre to mark out previously uncharted territory. Online little magazines like Andrei Codrescu's *Exquisite Corpse* (1997-2011) promoted sharable art manifestos in their pages and announced new ventures using the provocative and highly visual medium.

Advertising

Advertising and the avant-garde enjoy a shared history, and this shared history extends to the manifesto. The ism – Neoism, #Additivism, Xenofeminism – is a brand, and the manifesto is a marketing tool.

Starting in the 1970s, Jenny Holzer's *Truisms* and *Inflammatory Essays* series played on mass media, advertising slogans, and manifestos. An innovative precursor of what I'll call – with some reluctance – the 'memefesto', the *Truisms* have been circulating for decades and continue to circulate across diverse media. Manifestos make perfect memes because they are concise, eye-catching, assertive, often humorous and/or righteous, and generally engineered for maximum impact and efficiency. Truisms tracked this evolution from mass media to memes across decades. Looking forward, it seems likely that algorithms and sifting technologies will make manifestos more targeted, relatable, clickable, and pervasive.

Narrative

As Latour states in 'An Attempt at a 'Compositionist Manifesto'': 'Grand narratives are a necessary component of manifestos'. Think of that ghost story that begins 'A spectre is haunting Europe'; or 'The Founding and Manifesto of Futurism', that opens with the tale of how the manifesto was written and the movement founded. The origin narrative of Futurism includes a car chase – in 1909 – and a crash into a ditch, from which the Futurists are hauled out by a group of fishermen. On that very spot, the story goes, their incendiary manifesto was proclaimed to Italy and the world.

Latour tries to resuscitate the manifesto genre because it offers an alternative to negative critique and the 'debunking' spree of postmodernism. 'Compositionists', Latour declares, 'believe that there are enough ruins'; that we must at least temporarily 'suspend the critical gesture' and begin to 'reassemble'. Meanwhile, in his 'Manifestos for the

Future' in 2010, Obrist considered the future relevance of manifestos. Sensing the same shift as Latour, he argues that 'there seems to be an urgent desire for a radical change that may allow us to propose a new situation, to name the beginning of the next possibility rather than just look backwards.' Obrist sees the manifesto's potential for looking forward, for supporting 'radical change', just as Latour sees the need to 'suspend the critical gesture' for a time and shift the narrative toward positive reconstruction.

But while manifestos are always primarily action-based and future-focused, and in that sense potentially constructive, it is also hard to imagine a manifesto that is not simultaneously destructive, that does not leave behind critical ruins of some sort. It is a genre that represents, in Puchner's words, 'modernity as a process of innovative self-destruction'. This brings us back to a contemporary movement such as #Additivism.

Blood

In 2015, the suffix 'ism' was declared Word of the Year by Merriam-Webster's Dictionary. Over the past twelve months I have read countless manifestos announcing countless isms – including the 3D Additivist Manifesto, the Xenofeminist Manifesto, the Manifesto of the Committee to Abolish Outer Space, and more than one manifesto for Postcapitalism (including one by the former purveyors of Accelerationism) … these manifestos are boldly political, provocative, unselfconscious, and forward-looking. Unlike Neoism these movements no longer appear hobbled by irony – they are open to the revolutionary potential of our hyperconnected, globalized world – the 'global village' that McLuhan borrowed from Wyndham Lewis – where, for better and worse, all that was once solid has *literally* melted into air.

The 3D Additivist Manifesto is a good illustration of where the genre is headed. #Additivism understands the essential function of the manifesto: 'When the world feels stuck, the manifesto is a mode to disrupt it.' On one hand, there are still strong ties with the historical avant-garde: to speak only of Futurism, both movements: preach living through action and aggression; have a cookbook; cover not only art but all aspects of life; dream of their own multiplication; and draw energy from paradox (sex machines and chastity belts, aiding and disrupting surveillance). Similarly, the 'new' Postcapitalism combines elements of *The Communist Manifesto*, Oscar Wilde's 'The Soul of Man Under Socialism' (aesthetes with robot slaves), and Valerie Solanas's *SCUM Manifesto* ('institute complete automation'). So for all its desire to break with the past, the genre shows strong continuities. But along with these continuities there is radical new content and new means of circulation: the 3D Additivist Manifesto is a computer animated, web-based video; the movement relies on social media, and calls not for paintings and poems but glitches and algorithms and the manufacture of interspecies sex organs.

When Valerie Solanas faced reporters outside the 13th Precinct in New York on June 3, 1968 after she'd shot Andy Warhol, she stated simply: 'Read my manifesto and it will tell you what I am.' Manifestos are always – often literally – at the bleeding edge of culture and politics. In the current decade the manifesto has once again, as a century ago, found its moment. 'Without a manifesto', Zak Kyes told the audience at the Manifesto Marathon, 'we cannot conceive the future.' The genre continues to pry open new discursive and imaginative spaces, force new ideas into the public view, promote engagement with politics, technology, and other facets of everyday life, and push new frontiers of artistic and critical innovation.

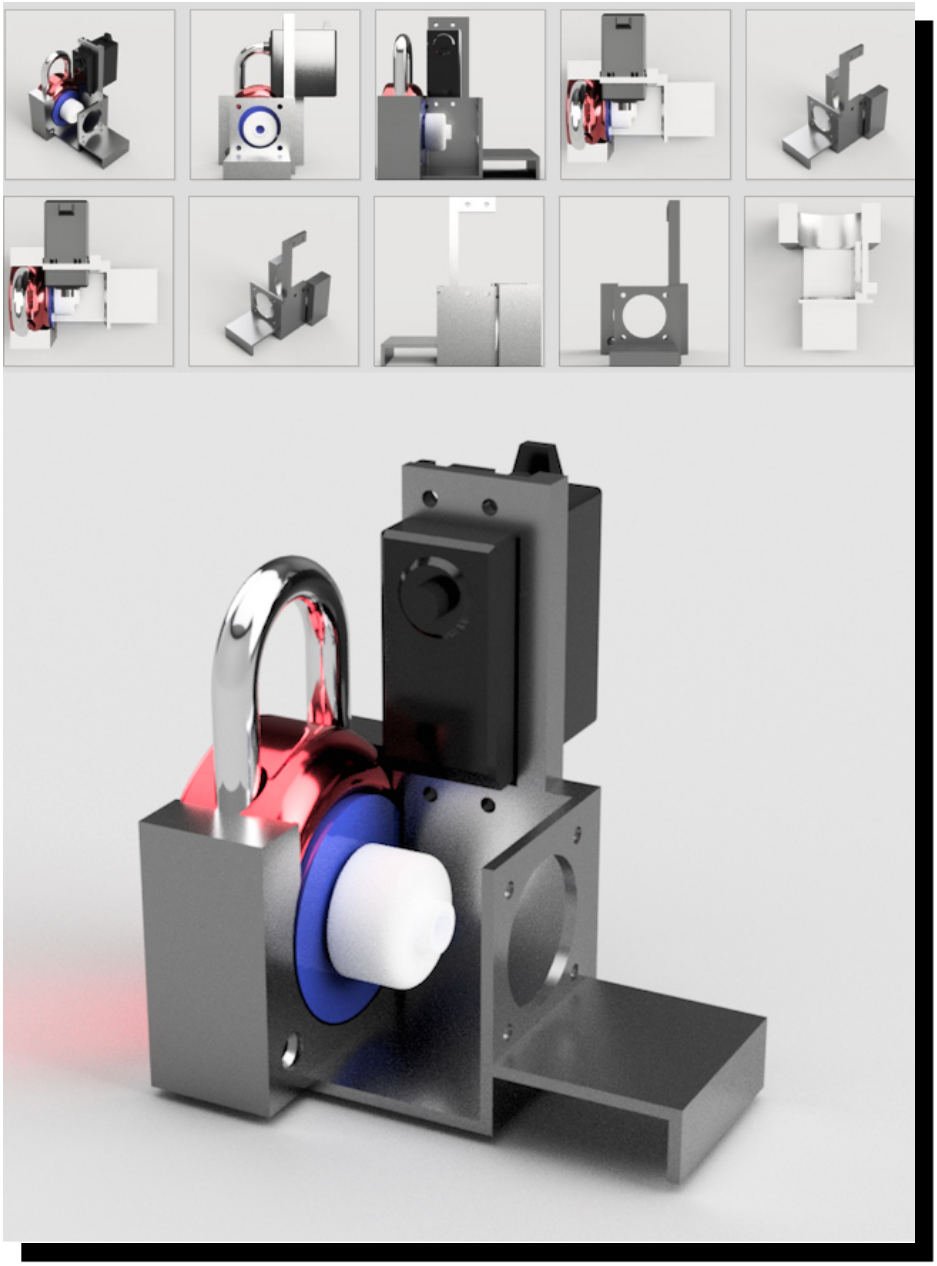
Samy Kamkar	Combo Breaker	2015
Author	Project	Year

#toolkit	#resistance	#break
Format	Theme	Action

Motorized, battery powered, 3D printed, Arduino-based combination lock cracking device

COMBO BREAKER

1/2



Combo Breaker is a motorized, battery powered, 3D printed, Arduino-based combination lock cracking device. It is portable, open source, 3D models provided, and exploits a new technique I've discovered for cracking combination locks in 8 attempts or less, but in an even more exciting, automated fashion.

2/2

Arduino Nano
$15: A 5V Arduino Nano microcontroller is used as the brains of the project.

Allegro A3967 / EasyDriver Stepper Driver
$8: I originally used an A3967-based EasyDriver which can drive a stepper motor up to 30V at 750mA. This is what precisely controls the dial.

Or Allegro A4988
$13: Instead of the EasyDriver, I upgraded to a smaller, yet more powerful stepper driver that can go up to 1 amp (1000mA).

Stepper Motor
$18: You can use a normal stepper motor for the 'simpler' version of the Combo Breaker build, however if you're working on creating the more advanced version, you'll need a double-shaft stepper motor like I liste below.

Or Double Shaft Stepper Motor
$16: This double shaft stepper motor allows you to build the more advanced Combo Breaker while employing an optical rotary encoder on the back to detect the position of the stepper when the dial stops turning (which is part of the exploit employed).

HKT22 Optical Rotary Encoder
$25: For use only with the double shaft stepper motor, this optical rotary encoder lets us know what position the shaft of the stepper motor is at and allows us to employ an exploit on Master combination locks where the stepper will get locked into certain grooves within the internal combination disc of the lock.

Analog Feedback Servo
$15: This servo not only provides the torque we need to lift the shackle (90.26 oz*in), but has an additional wire providing analog feedback that we use to detect the state of the shackle and whether it has opened or not.

L7805 Voltage Regulators
$5: If you're using the analog feedback servo, you'll want to use an external voltage regulator to provide enough juice to the servo. While the Arduino is 5V and can drive the servo normally, it won't be able to pump out enough current for the servo when it starts hitting the shackle and could damage your Arduino.

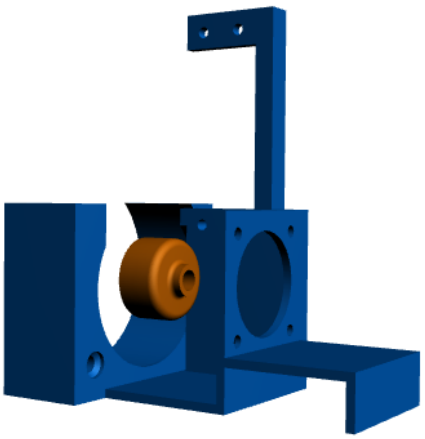
500mAh 3S Lipo Battery
$14: This 500mAh 3S (3-cell, 11.1V) battery gives enough juice to the stepper motor to be very effective, and at 500mAh can last between 30-120minutes straight before having to be recharged.

Lipo Charger
$45: This lipo charger is overkill if only used for this project, but is a good one that I use at home for a wide range of batteries and cells. You don't need this one, but if you want to recharge the battery, you'll need a charger that supports 3-cell LiPos.

Arctic Alumina Thermal Adehsive
$8: Not required, but this is the thermal adhesive I use to permanently attach the heatsink to the stepper motor driver. Normal thermal paste has very little adhesion and kept falling off, so I switched from thermal paste to this thermal adhesive.

Digital Calipers
$17: If you don't already have digital calipers for precise measurements to measure the lock, for example, these are inexpensive and accurate.

Breadboard and Wires
$9: If you don't already have a breadboard and wires, they will kind of help.



Print Green
Author

Print Green
Project

2016
Year

#recipe
Format

#matter
Theme

#smooth
Action

Method for creating a large scale biological printer

PRINT GREEN

Print Green uses a special CNC machine as a printing device. Instead of canvas it uses Styrodur, covered with black felt, bolstered with sponge. On this basis the CNC device applies/prints the mixture of soil, water and seeds. Instead of 3D printing cartridges organic mixtures are used, which become green with time.

The finished results are printed 3D models with capability of ‘turning green’. Print Green creates a ‘living’ design/print, a biological growth that transverses the motto ‘think, before you print’ and turns it into the slogan of an alternative printing ethic: ‘print, because it is green’.

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RECIPE:

1. For filament use soil which has been sifted through a kitchen strainer to remove any particles that are too big. It is important to use clay soil. You could also add seeds to the mixture at this stage but for this particular print apply the seeds later.

2. Prepare a wooden mold and print the chosen design into it.

3. Prepare concrete and pour it carefully into the mold.

4. When the concrete dries, remove the mold.

5. Carve away a couple of millimeters of soil on the print and apply seeds. We used watercress seeds but you can use a number of other plants (grass, chia...). But remember you will get best results with plants that do not grow too tall or spread too much. Water your building blocks daily, preferably a few times per day.

GRASS ORNAMENT/STAR RECIPE:

a. Sift clay soil through a kitchen strainer to remove bigger particles. Mix the soil with water. You could also add seeds at this stage but for this particular print it is best if you add them at a later stage.

b. Fill the mixture into the filament container and print the selected design.

c. Dry the print with a hair drier while the printer is printing.

d. Apply the seeds on the top layer of the print. Sprinkle the print with water daily, preferably a few times a day.

The project was designed by Maja Petek, Simon Tržan, Danica Korošec, Tina Zidanšek and Urška Skaza in the Intermedia arts course under the supervision of Ass.-Prof. Dušan Zidar.

Heather Dewey-Hagborg
Author

The Official Byononymous Guidebook
Project

2016
Year

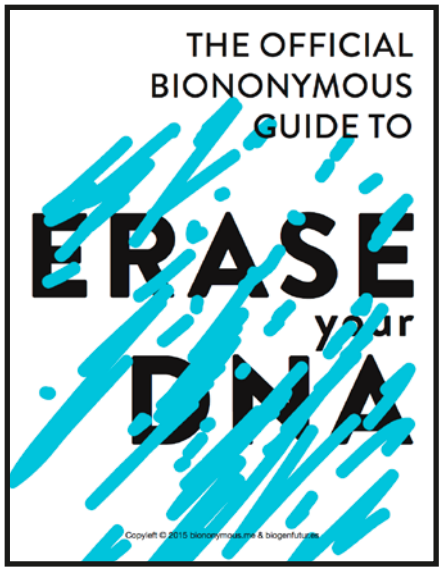
#recipe
Format

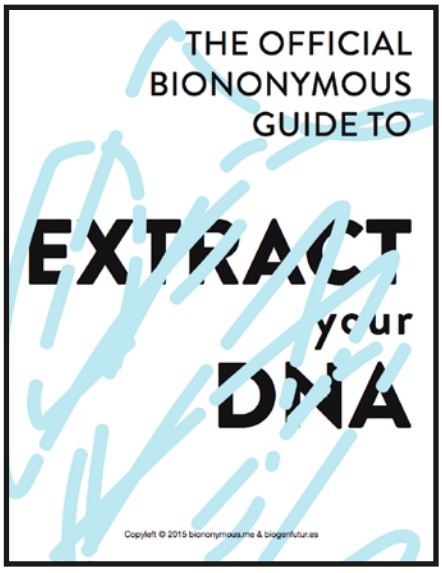
#postnature
Theme

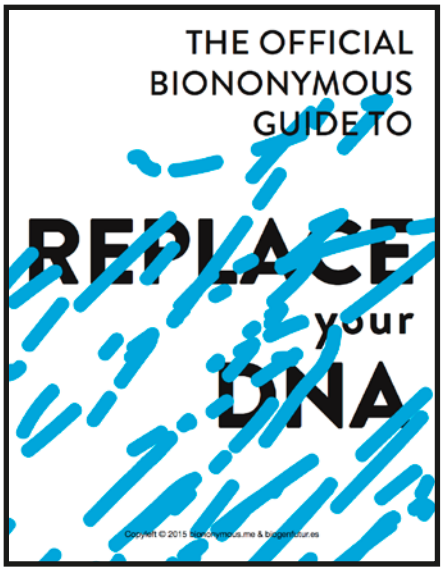
#replace
Action

An illustrated guide on how to practice DNA elusiveness

THE OFFICIAL BYONONYMOUS GUIDEBOOK







(A) (B) (C)

Written by Heather Dewey-Hagborg, Illustrated by Jarad Solomon

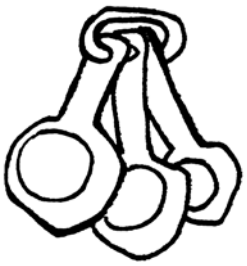
(A) ERASE YOUR DNA

Materials:

distilled water

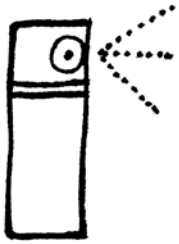
Clorox bleach*

measuring cups



funnel

spray bottle



kimwipes tissues or paper towel

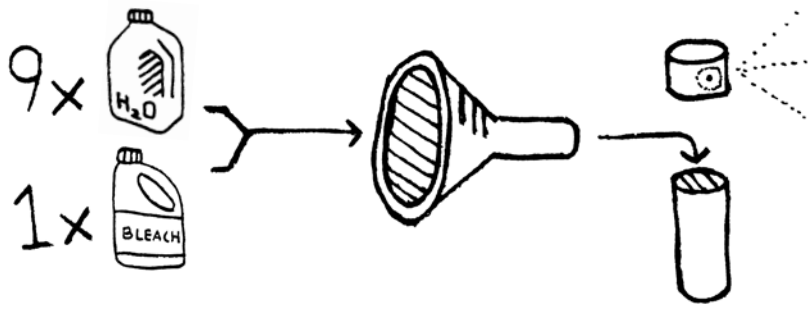
nitrile or latex gloves

*WARNING: Bleach is dangerous and extremely corrosive! Don't touch with bare hands, injest, inhale, or apply to anything delicate or precious.

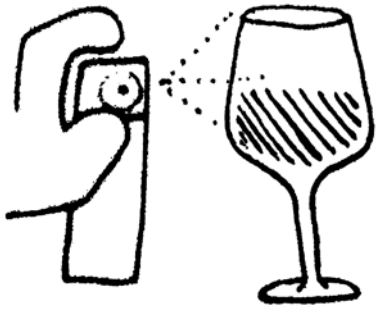
**TIP: DNA Away is slightly less corrosive than bleach and is available in handy to-go wipes.

Steps:

1. Wearing gloves, mix 9 parts distilled water with 1 part bleach. For example mix 1 ml bleach with 9 ml distilled water and pour into your spray bottle using funnel.



2. Spray the glass, silverware, or surface you wish to remove residual DNA from thoroughly.



3. Let the bleach mixture sit up to 30 min.

4. Wipe the bleach spray off with a gloved hand.

5. Wipe remaining bleach residue away with clean water.

(B) EXTRACT YOUR DNA

Materials:

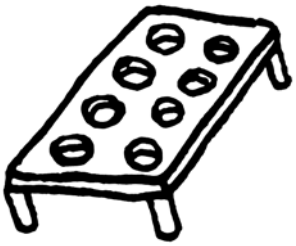
electric kettle
+ shrink wrap
or parafilm

measuring tool*

1.5 ml
microfuge tubes
+ permanent
marker

.9% saline solution

10% Chelex
solution
(100 µl per
person)



tube rack

1.5ml centrifuge**

paper cup (1
per person)

micropipet

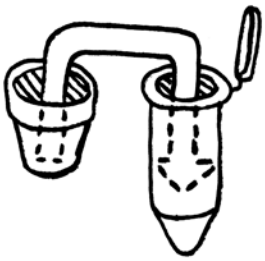
*TIP: You need to measure quantities of 30 ul, 100 ul, 1 ml & 10 ml
many inexpensive disposable measuring options are sold here.

** DIY your own centrifuge!

Steps:

1. Gather a group of friends/allies. The more friends, the more sources of DNA, and the more bionony mous you will be!

2. Put 10mL saline solution per person into individual paper cups. Put 100uL per person of chelex solution into microcentrifuge tubes.



3. Pour saline solution into your mouth, and vigorously rinse the inside of your cheeks for 30 seconds.

4. Spit saline solution into the paper cup.

5. Swirl the cup gently to mix cells that may have settled to the bottom. Use a micropipet with a fresh tip to transfer 1000 µL of the solution into your labeled 1.5-mL microcentrifuge tube.

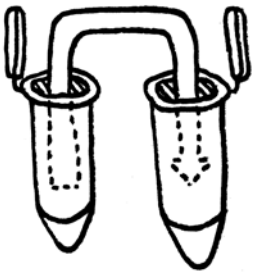
Steps:

6. Place the sample tubes in a balanced configuration in a microcentrifuge, and spin for 90 seconds at full speed.

7. Pipet out the supernatant (clear stuff at the top of the tube). Try to remove most of it, but be careful not to disturb the cell pellet (clump of white cells) at the bottom of the tube.

8. Set a micropipet to 50 µL. Resuspend cells in the remaining saline by pipetting in and out.

9. Withdraw 50 µL of cell suspension, and add it to a tube containing 100 µL of Chelex®. Label the cap and side of the tube.

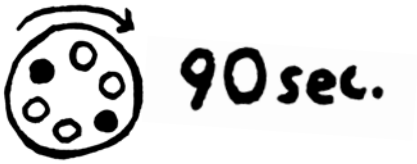


10. Boil the tubes for 10 minutes. If tossing in a kettle make sure the lids are tightly closed and seal with parafilm or shrink wrap.

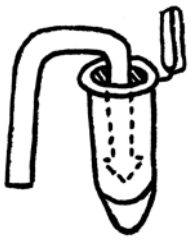
Steps:

11. Shake the tubes vigorously (or vortex) for 5 seconds.

12. Place tubes in a balanced configuration in microcentrifuge and spin for 90 seconds at full speed.



13. Use a micropipet with a fresh tip to transfer 50 µL of the clear supernatant into a clean 1.5-mL tube. Be careful to avoid pipetting any cell debris and Chelex® beads. Label the cap and side of the tube.



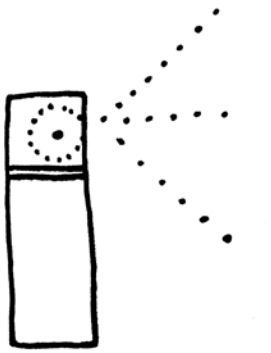
14. Store on ice or in the freezer until ready to use.

15. If you are in a fancy lab quantify your DNA using a nanodrop, Qubit or PCR + gel electrophoresis. If not, try using a capacitance meter.

(C) REPLACE YOUR DNA

Materials:

spray bottle



DNA mixture* 15ng/uL

water

item

DNA preservative***

* Online sources of DNA include: Quiagen and LifeTechnologies.

** Dilution guide.

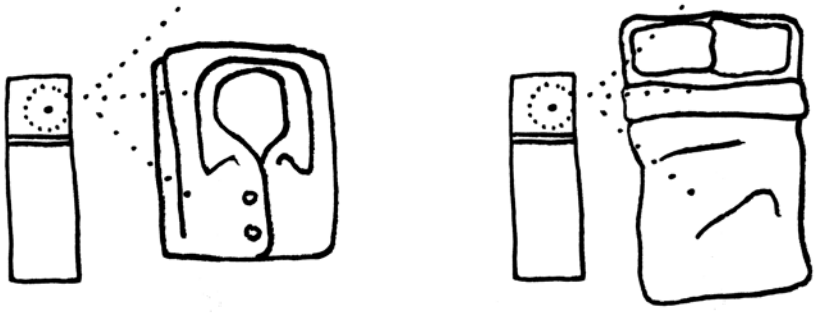
*** DNA perservative is a proprietary formula and potentially toxic so don't injest!

Steps:

1. To your spray bottle add 2 mL DNA mixture, 1 mL water & 1 mL of preservative (if using, otherwise add another 1 mL water).

2. Mix well.

3. Spray liberally on sheets, clothing, soft and sensitive items. Use like febreeze! You can even spray it on yourself if you don't include the preservative. I wouldn't drink it though.



BECOMING HORROR IN THE PLASTICENE

"THE PLASTICINE IS AN ACTION BEING CARRIED OUT ON ITSELF; A WAVE MOLDING THE VERY SUBSTRATE THAT CARRIES IT, AS IT CRASHES AGAINST ITS OWN DEFENSES."

Upon visiting an exhibition of plastic in Paris in the mid 1950s, Roland Barthes wrote a short essay on the metaphoric qualities of the 20th century wonder material:

> More than a substance plastic is the very idea of its infinite transformation; as its everyday name indicates, it is ubiquity made visible. And it is this, in fact, which makes it a miraculous substance.[1]

Barthes' *Mythologies* collection, from which his *Plastic* essay is taken, was an elegy on the everyday. In banal capitalist commodities and pop cultural clichés Barthes sought out the magical, revealing the everyday as the fountain of secular mythology.[2] Plastic is seemingly infinite in its capacity to be formed and used, and it is this feature which renders plastic meaningless in itself, able to take on *completely* any gesture or idea that is breathed into it. The substance's descent to prosaic, crass, cheap, and expendable is – for Barthes – precisely what marks it as miraculous. The transformations plastic is capable of going through give us, according to Barthes, a measure of our power, 'since the very itinerary of plastic gives [us] the euphoria of a prestigious free-wheeling through nature.' With remarkable prescience, and in retrospect, breath-taking ecological ignorance, Barthes foresaw a time where 'ultimately objects will be invented for the sole pleasure of using them.'[3]

A substance of unrivaled utility and acquiescence, the miraculous, 'sudden transformation' of plastic, soon gives way to the mundane, through the rituals of use and waste that organize our collective hyperconsumptive disregard. We swaddle our food in plastic, and place it in babies' mouths to aid in their weaning. It protects and insulates the surface of our bodies, and its nonreactive properties see it plunged inside us during medical procedures. But plastic is ultimately ready to be discarded as soon as it is produced, one of the many pathologies of our capitalist yearning for comfort and economic renewal. As Felix Guattari noted, 'capitalism remains a formidable desiring machine. The monetary flux, the means of production, of manpower, of new markets, all that is the flow of desire.'[4]

Digging through landfill middens produced by capitalist accumulation over the last century, future archaeologists will peel at layer beneath layer of plastic food packaging, baby pacifiers, and unfixable kitchen appliances in a journey back through our times. This kipple indicates and organizes the fashions of each decade, not only in testimony to what consumers once valued, but 'as a material enactment of forgetting.'[5] As Myra J. Hird observes:

> Landfills swell with things we once wanted and now do not want, once valued and no longer value. What remains *after* our disgorgement is what we (want to) consider our *real* self.[6]

Our obsession with forgetting, Hird suggests, is ritualized through the separation, organization and eventual dumping of waste. Calling on Mary Douglas' work on impurity and pollution, Greg Kennedy defines waste as that which 'settles outside the ruled lines of our conceptual schema,'[7] remarking further that 'a society preoccupied with concealing its wastes must have something important to hide from itself.'[8]

'Calling out Roland Barthes' obsession with plastic as a substance of instantaneity, Heather Davis regards oil and its plastic miscellany as a form of *slow violence* of inexplicable, drawn out, material consequence. 'Plastic,' Heather Davis suggests, 'is the ultimate material of tempophagy, or time-eating, one that consumes the compressed bodies of ancient plants and animals, a process that took thousands of years, only to be transformed into a single-use take-out container.'[9] One of many precocious children conceived by crude oil and industrial capitalism, plastic is composed of long strings of organic polymers separated by fractioning processes. Oil itself is what Amanda Boetzkes and Andrew Pendakis call 'fossilized death;'[10] a fluid, concentrated remainder of entire ecosystems, coalescing over millions of years into the lifeblood of capitalist causes. Once disposed of and disregarded, plastic enters into a further, distended relationship with microscopic flora and fauna. Broken down into microplastic fragments by exposure to the sun and tidal forces, plastic become an ecosystem for bacterial colonies and viruses, locking themselves to its smooth surfaces. As it disperses even further, plastics leach their chemical constituents, perhaps most infamously *Bisphenol A,* which mimics the effects of the hormone estrogen, and has been shown to impact on the fertility of fish, amphibians, and some evidence suggests, human beings. As Erik

1 Roland Barthes, ***Mythologies*** (London: Vintage, 2009).
2 Ben Highmore, ***The Everyday Life Reader*** (Psychology Press, 2002), 305.
3 Barthes, ***Mythologies.***
4 Jane Bennett, '***Powers of the Hoard: Artistry and Agency in a World of Vibrant Matter***' (Lecture, Vera List Center for Art and Politics, 26 September 2011)
5 Myra J. Hird, '***Knowing Waste: Towards an Inhuman Epistemology***', Social Epistemology 26, no. 3–4 (October 2012): 456
6 Ibid., 457
7 Greg Kennedy, ***An Ontology of Trash: The Disposable and Its Problematic Nature*** (Albany, NY: State University of New York Press, 2007), 6.
8 Ibid., 4.
9 Heather Davis, '***Toxic Progeny: The Plastisphere and Other Queer Futures'***, philoSOPHIA 5, no. 2 (2015): 235
10 Amanda Boetzkes and Andrew Pendakis, ***'Visions of Eternity: Plastic and the Ontology of Oil*** | E-Flux', E-Flux, no. 47 (September 2013),

Swyngedouw persuasively argues, we cannot escape, '"producing nature"... [forcing] us to make choices about what socio-natural worlds we wish to inhabit... a qualitative transformation of BOTH society AND nature has to be envisaged.'[11]

Today, perhaps the most iconic testament to planetary forgetting is the Great Pacific Garbage Patch. 'The creation,' theorist Jane Bennett explains, 'of the conjoint actions of water currents, capitalist accumulation, a fervent ideology of economic growth and free markets, and the trillions of plastic bags, toys, packagings, machines, tools, bottles that humans manufacture, use and discard every minute.'[12] In the Great Pacific Garbage Patch ritualistic forgetting becomes monumentalized at a scale difficult for us to comprehend. It is what Timothy Morton refers to as a 'hyperobject', an entity of such size and magnitude that it dwarfs our perceptual schema. For Morton hyperobjects like the Great Pacific Garbage Patch, or Global Warming, the nuclear catastrophe at Fukushima, or The Gulf Oil Spill of 2010, are cataclysms that *close the beyond*.[13] There is no 'away' anymore, no 'Outside' into which we can ritually cast those things we wish to rule out of the schema of ourselves. The Great Pacific Garbage Patch is a distributed testimony of forgetting that plasticizes the entire planet, and will remain etched into the geological record long after we are gone. The horror of The Plasticene is one impossible to escape, and it binds humans and critters in ways that far exceed the provisional title of 'we'.

The Plasticine is an action being carried out on itself; a wave molding the very substrate that carries it, as it crashes against its own defenses. This is, echoing theorist Eugene Thacker, the promise of *horror*: to be able to take 'aim at the presuppositions of philosophical inquiry – that the world is always the world-for-us – and [make] of those blind spots its central concern, expressing them not in abstract concepts but in a whole bestiary of impossible life forms – mists, ooze, blobs, slime, clouds, and muck.'[14] Within these 'impossible life forms' cultural norms are disturbed as monsters, and unstoppable, invisible forces battle for supremacy at the edges of human imagination. And because these horrors are themselves plastic, malleable forms, able to incorporate all manner of mutated beings and disturbances, they are 'as unstoppable as the transformations [they] mirror'.[15] That is, as Rosi Braidotti argues, only horrific figures can keep up with, represent, and perhaps combat, the horror of our times.

The world that The Plasticene brings into being has no outside, no beyond. It swells to oceanic proportions, and dwells in the guts of microflora, fish and amphibians, shifting their hormonal make-up to amplify human causes to a planetary scale. In an ironic turn, Roland Barthes' proclamations on plastic have become an indicator of the kind of mutual morphologies our planet sustains. For just as Barthes marked out plastic's seemingly infinite capacity to be molded into any mundane and/or horrific shape humans willed upon it, so in the era of The Plasticene the roles have been reversed. 'Nature' becomes, for plastic and other waste materials that bubble and leach at the echelons of civilization, a mere substrate to be lent form through chemical muddlings and additivistic altercations. By tracing just one material consequence of our hyperconsumptive civilization it is possible to see an alternative becoming of nature qua human that 'weaves all beings into the interdependent context of the manifest world.'[16] A world that exceeds any 'we' any 'us' that confronts it; a world showing itself to have always already been plastic in its capacity to constantly reform and envelope itself.

11 Erik Swyngedouw, *'Apocalypse Now! Fear and Doomsday Pleasures'*, Capitalism Nature Socialism 24, no. 1 (March 2013): 18
12 Bennett, *'Powers of the Hoard: Artistry and Agency in a World of Vibrant Matter'*.
13 Timothy Morton, *Hyperobjects: Philosophy and Ecology after the End of the World*, Posthumanities 27 (Minneapolis: University of Minnesota Press, 2013), 94.
14 Eugene Thacker, *In the Dust of This Planet* (Ropley: Zero, 2011), 9.
15 Rosi Braidotti, *Metamorphoses: Towards a Materialist Theory of Becoming* (Wiley, 2002), 185.
16 Kennedy, *An Ontology of Trash*, 162.

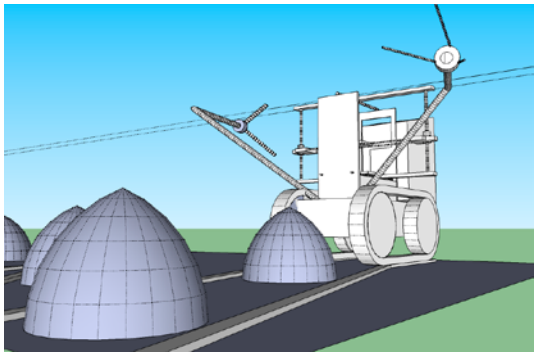
Woelab-Lomé	W.Afate 3D Printer to Mars	2012
Author	Project	Year

#fabulation	#kipple	#extrude
Format	Theme	Action

Relocation of computing garbage dumps to Mars via the development of a new generation of autonomous machines made from recycled waste

W.AFATE 3D PRINTER TO MARS

1/2



Our waste for space exploration
Rather than send its computer waste to poor countries, why would the West not send it to Mars? Our project wants to realize this utopia. The W.AFATE, an African 3D printer completely built from e-waste, is a pioneer of this new era representing the ecology and virtuosity of space conquest. An African 3D printer at the forefront of interstellar recycling.

From recycling to Self Assembly 4D Printing
The W.AFATE will make and print tools and machines for a new life on Mars. Our machines carry the promise of cosmic adventure, allowing others to make active machines for creating the necessary equipment and living environments in anticipation of a possible colonization of the planet Mars. The W.AFATE will create objects that can change after they are printed, making and remaking themselves. Instead of building something new, why not create materials that build themselves? Machines that produce themselves with minimum energy consumption and without a computer to order... all you need is environmental waste.

Problems which our solution resolves:
- Avoiding and relocating pollution on Earth.
- Reducing the enormous costs involved in the conquest of space.

Questions we still need to answer:
- What energy are we going to use?
- With what materials on Mars are we going to print?
- How are we going to command these machines?

W.AFATE to MARS is primarily an international collaboration between Africa and Europe as part of Space Apps Challenge 2013. In La Cantine/Paris Sénamé and Julien met. They mobilized the WoeLab team based in Togo, West Africa, and worked in duplex with them to develop the project.

WoeLab is an innovative community based on sharing and collaborative initiative. W.AFATE is one of the very first African symbols of this contemporary movement of ‘commons’ which is being developed around the world and channelled through African traditions.
The W.AFATE is an invention of the entire WoeLab Community, including all the thirty young residents who benefits from the WoeLab program.

THE MANUFACTURING OF THE W.AFATE IN 10 STEPS:

1. Collect the materials: out of order CPUs, rails, scanners or photocopier motors, Arduino card, electrical wires.

2. Gather tools: hammer, hacksaw, drill, soldering iron, screwdriver.

3. Dismantle the UC and retrieve the chassis with an alimentation box which will supply the Arduino card.

2/2

4. Manufacture the printing plate.

5. Put the printing plate on the chassis with fixing rails (y).

6. Put the rails on the print-head or the extruder (x). This assembly will be synchronized with that of the rails allowing the extruder to go up and down (z).

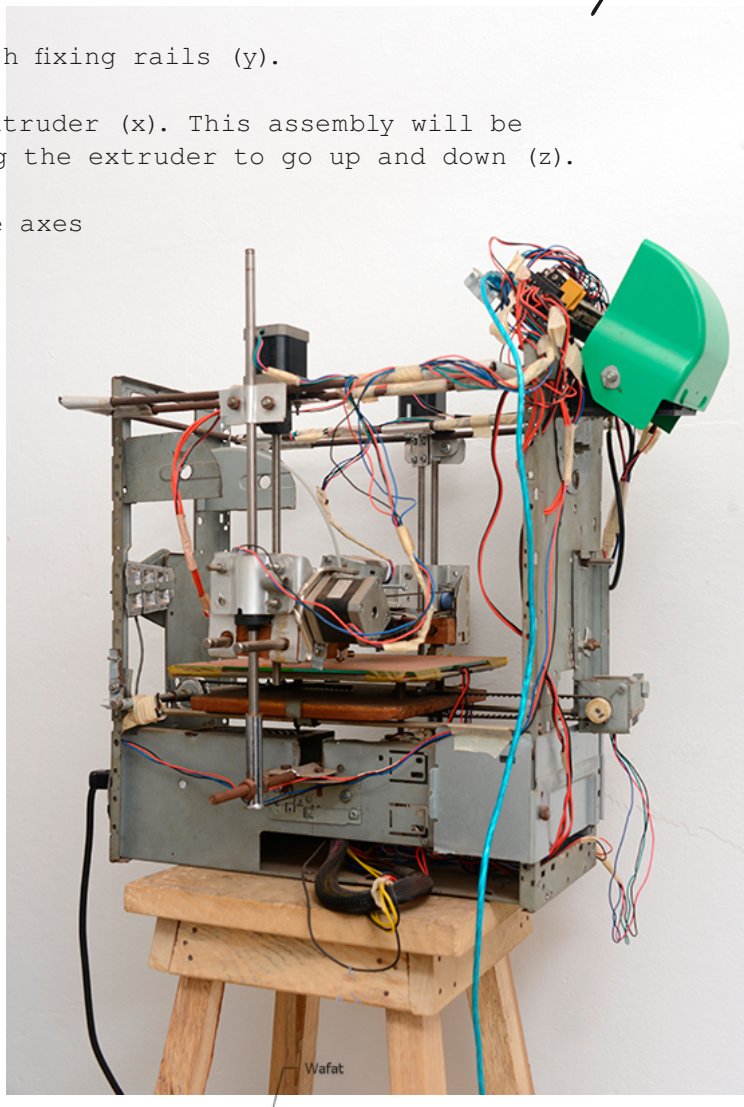
7. Put the four motors controlling the three axes x, y, z.

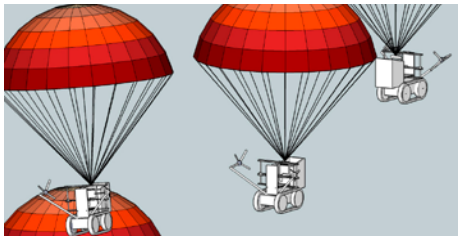
8. Fix the interrupters.

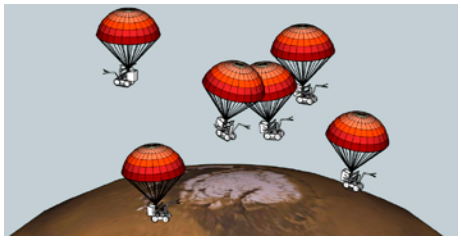
9. Manufacture and assemble the extruder.

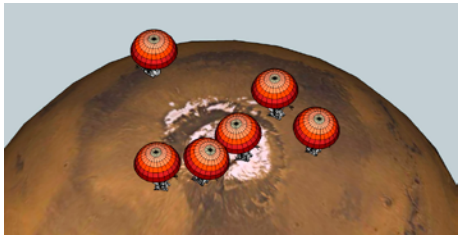
10. Connect elements to the Arduino card.

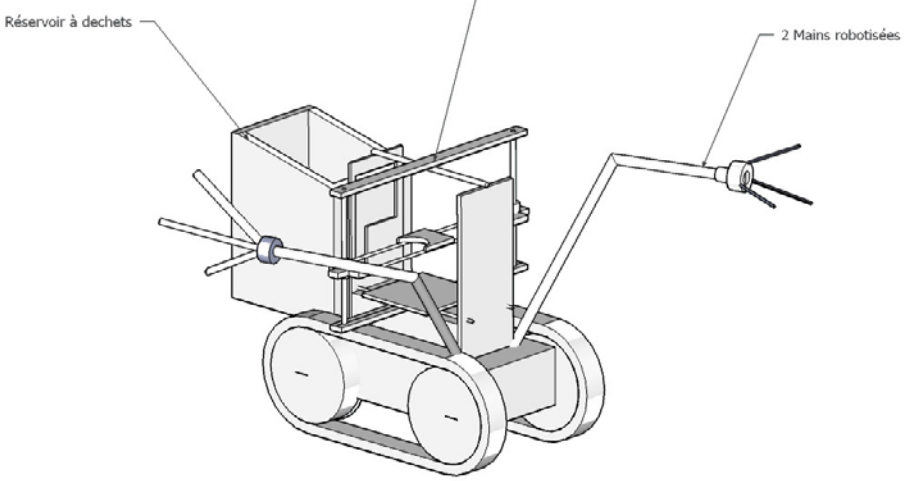
11. Send to Mars.







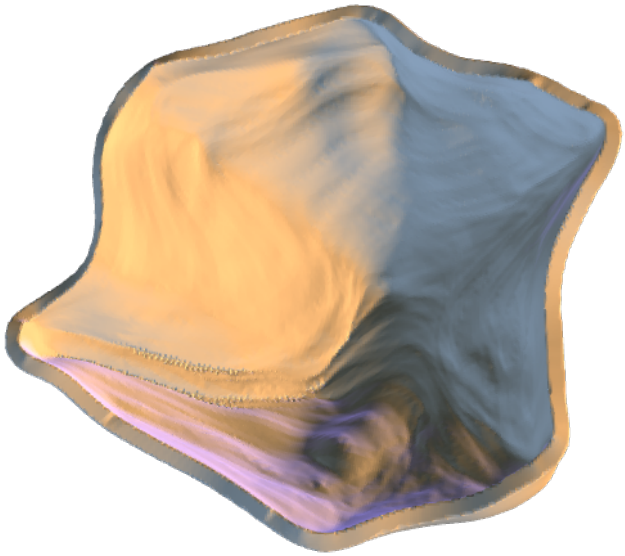




Geraldine Juárez	Kauri	2015
Author	Project	Year

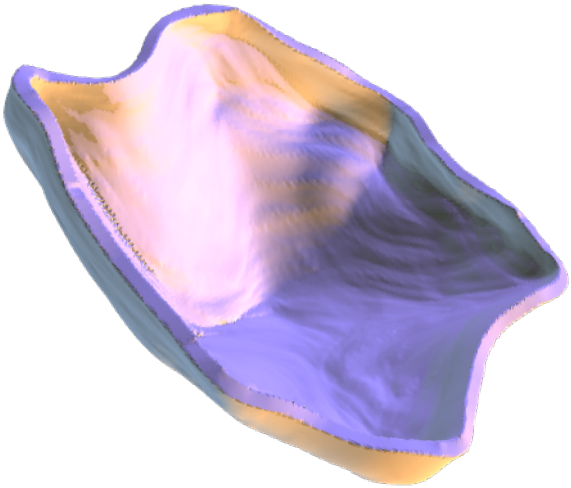
#device	#beyond	#morph
Format	Theme	Action

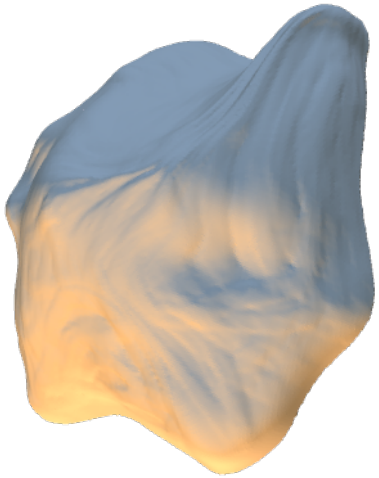
A ritual currency in the shape of a seashell that allows you to perform both gift and commodity forms of exchange



1/2

KAURI





‘…tiny hollowed out negative spaces…
the shell that can hold some water that can be shared’
– Donna Haraway

Jussi Parikka - Geology of Media

RITUAL:

- Download Kauri.stl and 3D print it.
- To use the kauri, first induce a shell-like metastable state, by choosing the side that corresponds to the type of exchange you wish to perform.
- The hollow side must be used if you wish/need to perform a gift exchange.
- The solid side must be used if you wish/need to perform a commodity exchange.
- After this decision, now you need to perform a small ritual to designate the economy in which the currency will operate.
- To create the space for gift economy use the hollow side to collect and hold water on it. Drink a little and then share it with the person you wish to perform the exchange.
- To create the space for commodity exchange put the cash you will exchange for a commodity underneath the shell, the receiver will need to remove the shell to take the money.
- If you don’t have access to a 3D printer, you can walk down a sea shore and look for a shell which can be used in the same way following these instructions.

Market and non-market, as well as human and non-human exchanges always involve some kind of energy: geological formations, labor, desires, metal extraction, feelings, bitcoin rig miners… Energy is the basis of all human activity, and today, money is too. Money can facilitate mutual aid and also destroy it. Money can feed you but also can enslave you through debt. Money can produce joy or tragedy. Money, like energy, must be spent. Encrypted fantasies and automated trust are not the only futures available for exchange, after all ‘the digital is a regime of energies’. The kauri is a currency between the tiny hollowed spaces and the ritual that favors the material transfer of wealth and non-automated trust, to instigate a brief moment of metastability, of deceleration.

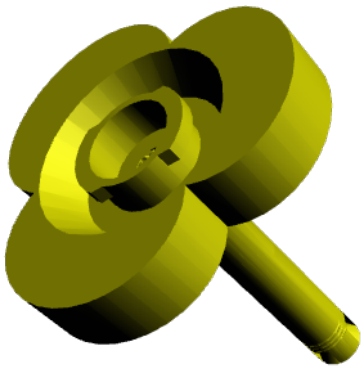
Money is always going towards the future, but the future doesn’t have a fixed direction. The kauri was designed to provoke a state that can result in two different types of economic exchanges, yet be interfaced by the same currency: one side opens up a space for a gift exchange and reciprocity by holding water in the shell; the other side designates a space where the privileged position of market exchange is reaffirmed, by capturing the money with the shell.

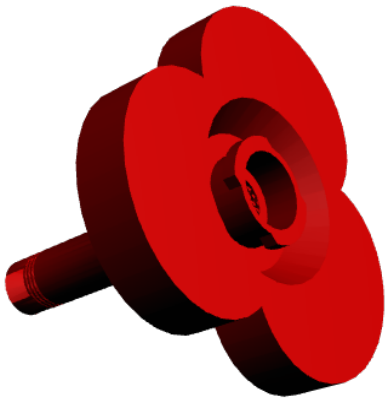
Anonymous	Pistil	2016
Author	Project	Year

#toolkit	#resistance	#constrain
Format	Theme	Action

The Pistil is a 3D printable object designed to render a gun useless

PISTIL



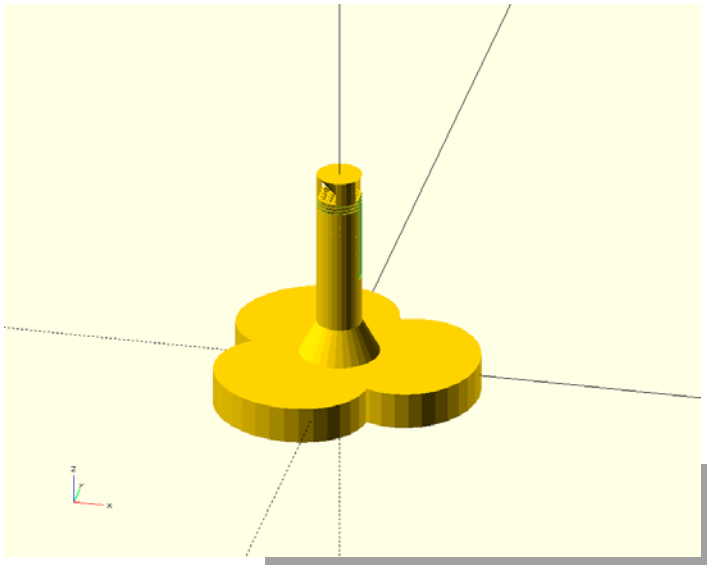


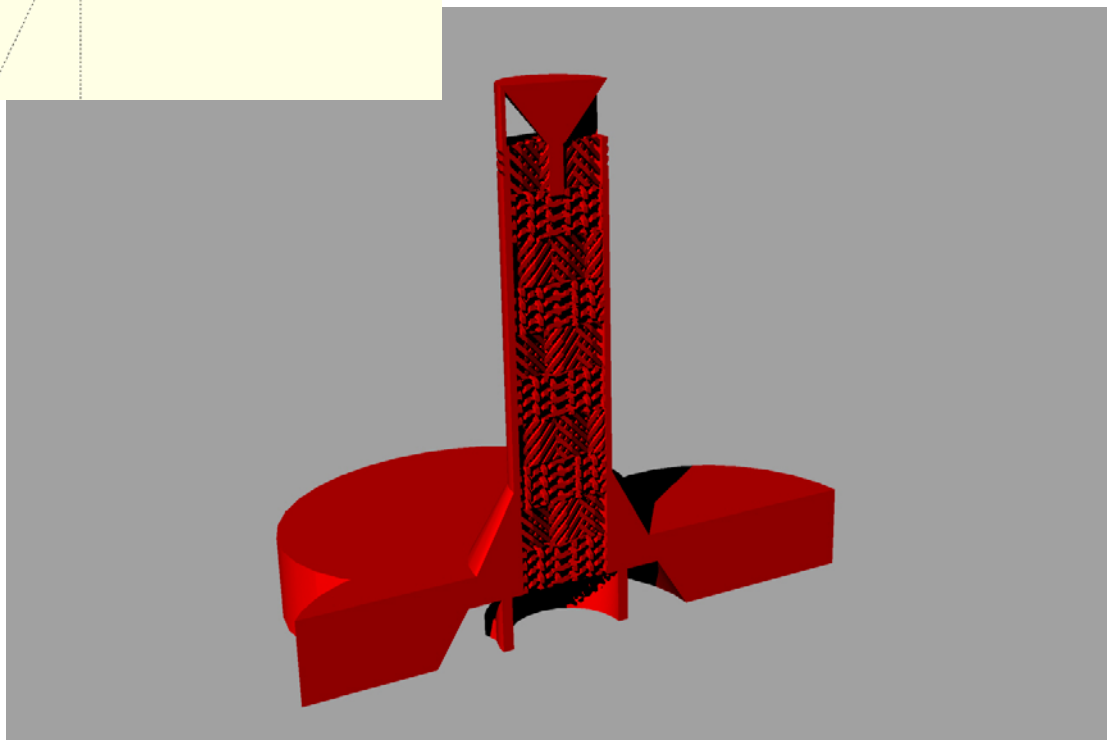
The Pistil utilises what all guns have in common: an open cylindrical hole at the deadly end. The Pistil is a combination of three parts: an attachment to connect to a syringe of 2 part epoxy, a complex static mixing tube to mix the two ingredients, and a spreader that pushes the mixed epoxy onto the walls of the gun barrel. The Pistil was designed for a 25mL syringe of J-B Weld KwikWeld, a two part epoxy that cures in 6 minutes and contains metal filings for strength. (The use of other epoxies is possible, but a new attachment will need to be designed.) The current design uses geometry to lock the epoxy into the rifling of the barrel and lock the Pistil into the gun. For a strong visual indicator that the gun has been disabled, the base of the Pistil resembles a flower. It is recommended to print the Pistil in red or floral colors.

A gun is the most obscene object. Its invention was predicated on the desire to destroy another human. Thanks to the work of Cody Wilson, we also have undetectable, plastic guns that anyone can make. The gun is unwelcome in all aspects of my life, but when I mention to people that I am a 3D printer operator, the conversation most often turns to 3D printed guns. This combination of my most despised object and favourite technology is crushing. I wish I could remove all the guns from the world like all the ink from the pool. But what if 3D printing could counteract this deadly technology? If you can print a gun, can you print the opposite of a gun? Short of 3D printing a whole hospital, there is nothing I can print to undo the damage of a gunshot wound. So, I designed an object that, when applied to gun, renders it useless and removes one gun from the world. Gun plus anti-gun equals no gun. I believe that 3D printed weapons are inevitable, but this is my attempt to resist that technology.

INSTRUCTIONS FOR THE USER:

1. Modify the design file to fit the barrel, or print a standard calibre file.
2. Use the Pistil only on an unloaded gun. If you are unsure if a gun is loaded or not, do not handle the weapon.
3. Remove the epoxy from the packaging and connect it to the attachment at the flower end of the Pistil with a quarter turn.
4. Insert the Pistil tube into the barrel of the gun.
5. While holding the Pistil as far into the gun as possible, force the plunger on the syringe down, forcing all of the epoxy through the mixing tube and into the gun.
6. Remove the syringe, but keep the Pistil in place. The Pistil is designed for a single use.
7. Do not hide the damage you did to this gun. A blocked gun barrel is dangerous to both the shooter and the target. The Pistil cannot keep you from being shot.
8. Print more Pistils.





COLLAPSE

"DESPITE THE CONSTANT AIRSTRIKES IT WAS ONLY IN THE BOAT THAT HE FELT CLOSEST TO DEATH – A SMALL FLIMSY THING FLUNG ABOUT IN DARK WAVES, DESPERATELY GRIPPING THE SIDES FEELING IT WAS GOING TO FLIP OVER AND BE SWEPT AWAY."

While picking through hybrid plastic-rock samples in the lab, they found fragments of seemingly melted objects, some distorted and compacted, others still partly recognizable as a toothbrush head, a child's toy.

In the neighbouring Biomarine Department they peered into dissected flesh laid out on the white slab, curiously picking out bottle-tops nested in stomach casings with forceps. The remnants of six- pack rings constricted growth, morphing and forcing flesh to grow around it, weakening spines and limiting their ability to swim. New coral formed and sprouted through bundles of cargo net on the seafloor, and sea snails clung to the sides of plastic bottles in clusters. They re-covered the trays and delivered them back in to the freezer room, as a young researcher stripped the slimed latex gloves from his hands and headed across the corridor to Medicine and Surgery.

The head doctor described with enthusiasm how formerly they had to handle slippery masses and grasp tightly to push tubing through, but now they handled plastic hearts made to any size resting on their palms; a different kind of dead matter, from dead cells to chemical reductions. The emissions of burnt-plastic fumes had reacted upon the chunks of lungs that also graced the table. Small mutations, tumors and other seemingly inexplicable malformations erred away from the anatomical models they had previously learned in university lecture halls, projected up high in linear outlines above students in rows hurriedly taking notes.

The tower of the building mirrored the other side of the covered compound, the Department of Architecture, Environment and Planning. In a boardroom concerned engineers and architects stared on morosely at the bleak predictions. They remember being told before in the hundreds of meetings discussing toxic sites and insurance payouts from flooding, but people hadn't paid much attention as the dimmed lights and generic graphs made people shift in their chairs. The dust seen in the projector rays, the hum of machines and boredom overlaid diagrams of isostatic rebound, glacier-melt causing the north-west to rise, converging with rising sea-levels to lead water to trickle through the marshlands and ex-industrial shores and slowly wash their way through the City of London. Now they desperately problem-solved and sketched out ideas, the panic of any failure causing direct death felt different to the previous adrenaline of all-night team assignments. At one point they thought they could re-use the tangled plastic islands floating in the sea through skimming along and filtering the waters with seabins to convert them back to oil. However the huddles of decomposing fish, shark and human corpses that had also swept up and entrenched themselves into the structure made this more difficult. The lab boats continued on past the stranded survivors gathered on the plastic raft, a floating terrain, those not accounted for in the Emergency Recovery Plan. It was considered human trafficking for those manning boats to transport them back to land, and they knew the samples would be hard enough to get past the Border Agency. So they gave a casual stare of indifference and after retrieving what they needed, made their way back. The soon-to-be-dead had been edged off the land from flooded cities and taken by the current, scrambling to recoup and stay afloat, and lightly covered in a greasy film amidst the rotting carcasses.

In the downstairs classroom a young team were re-working prototypes for a new series of 3D- printed temporary shelters, after the problems of the others became apparent. Requiring lorries to transport generators and stacks of plastic to the cities and then to the camps where the roads were dirt tracks had been inefficient. Many had broken down and were eventually taken to the dumps surrounding the camps to be thrown away, giant printer frames abandoned next to faulty generators, with embossed Chinese script. When plastic supplies were low, they'd tried melting down found bottles and bags to force through the tubes but it just got blocked, so these were discarded and they resorted to building shelters from crates, tarpaulin and concrete canvas like the old days.

Akram was sitting in one of the first series of plastic shelters crowding the outside of Dbayeh camp overlooking Beirut. Too hot inside under the burning sun and lacking ventilation, they couldn't withstand the increasingly extreme weather conditions. The smell of heated plastic drove him outside to the smell of garbage piled high and carried on the breeze. They used to cover it with rubble to obscure the fact they had no disposal strategy, but they didn't anymore and the stray cats and small children freely clambered over them to pick out useful debris. Some supplies were brought up from the city center by former-maids from the Philippines and Ethiopia. They occupied their employers properties after they'd left for the UAE with the promise of an elite escape plan. However, they heard reports of the scorching heat burning the fake implanted grasses, and camel corpses collecting by the motorways after wandering in from the desert. There were also a few westerners in the camp in different shelters; initially they were volunteers who, despite being warned that it'd be extremely difficult to return, had never experienced an obstruction to their travel so couldn't conceive of such a turn of events, and were now also a permanent part of the camp population. Akram remembered washing vehicles in the Majnoon oil field back in Basra, the heavy smell in the air

and the stickiness remaining on the skin. This was followed by a period of empty, panicked waiting that ended in leaving with few belongings on an over-packed bus. He recalled the smell of petrol from the motor whilst crossing the waters, and of sea-salt which at that time was comforting and promising; having spent seven years showering in it since, never being able to fully wipe off the white dusty residue, he felt differently. Despite the constant air-strikes it was only in the boat that he felt closest to death- a small flimsy thing flung about in dark waves, desperately gripping the sides feeling it was going to flip over and be swept away. But they eventually staggered to shore. He tore off the front page of his passport in the hope they wouldn't be able to read the Arabic script and would be sent to a Syrian camp, as he'd heard numerous times on the way that they had better facilities. The fires in Dbayeh were different to the acrid smoke of burning plastic lit by people waiting outside in queues in Lesvos. They were mainly young men, shivering and rolled up in the plastic coverings shed from bales of blankets, stocked from the many organizations with meaningless letter combinations like UNHC-. They'd run out of blankets as they'd been given to families who'd been fast enough to wake their children inside the tents where condensation clung, directing them half-asleep to queue at the temporary distribution point. They stayed there until they were beaten back by police that charged the crowd. Had he known, Akram would've kept the life- jacket and scraps of the deflated boat strewn along the shore after hitting some rocks. He would've dried them out over the fires and hung them up on the razor-wire, which had a constellation of clothes and torn strips that remained after attempts to remove them. It was a few weeks later that the authorities forcibly sent him back to Turkey, tear-gassing the crowds and herding them with tanks. After many months and desperate attempts, he was offered a more certain route for a lower price, and though promised Amman, made it to Beirut. The third generation Palestinian children that lived at the core of the camp were testament that this wouldn't be a temporary stop-over.

Back in the lab, other parts were not discernible to them. In the rock slices on glass, they found it marbled through with strains and nuggets of plastic that were unidentifiable. They'd been chipped off from small sculptural forms, 3D printed artists works once shipped round the world to new museums for critical accolades, cushioned in crates. Despite the urgency of certain narratives to small groups of people reading books and debating fiercely, it seems that most people had been waiting for someone else to act first, feeling unable to shift things alone. Regardless of the off-grid communes that began to crop up around the city, assembled by squatters, activists and other people sensing how imminently things would disintegrate, no-one ever made the first official move. They waited for scientists with knowledge, who waited for businesses with funding and logistics, who waited for governments with policy and law, who waited for the populace to tell them what they wanted them to do. They sat through the initial smaller-scale floods, the soaring temperatures, the slowly accumulating camps in barren fields and hillsides, continuing to quietly and patiently wait.

Marija Bozinovska Jones and IYDES
Author

Echoes of Earth: The Rocks of Us
Project

2016
Year

#recipe
Format

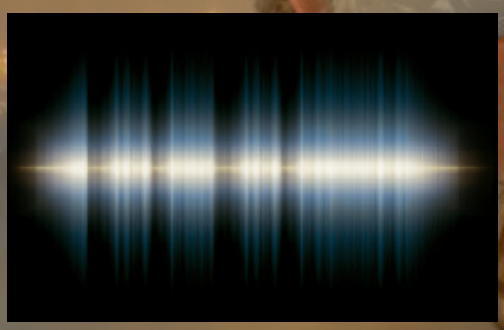
#matter
Theme

#extract
Action

A secession of speculative 3D printed artifacts from the future past

ECHOES OF EARTH: THE ROCKS OF US

1/2



Listen to the Earcon Wave'

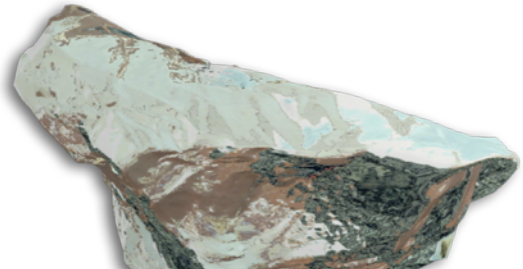
2/2

‘Echoes of Earth’ proposes a hypothetical future narrative: it takes the premise of communicating information about our society to intelligent entities in the distant future via archaeological artefacts. These artefacts broadcast our self-image across eons and combine artificial 3D printed segments and naturally occurring sediments in a conglomerate rock structure. The organic components carry information as bio-/ecofacts, while the inorganic printed smart plastic parts are embedded with information. The data is designed by global information technology brands, which synthesize our contemporary values and knowledge while overlapping social and corporate relations.

Melting, molding and continuously transmorphing, plastic seems indestructible. With its endless circulation, it has become the material that epitomizes the era of the homo sapiens as an agent. Plastic disperses around the planet via globalized trade driven by hyper-consumerism. As it contaminates the environment and merges with the geology of previous eras, fabricated matter is beginning to amalgamate with nature in the form of plastiglomerate1 rocks.

The process of prototyping 3D printed rocks as representational objects explores the paradoxical materiality of artificially reproducing and substituting nature. Plastic, being a durable information carrier capable of outlasting generations of humans, demonstrates the anthropocentrism of capitalist society long after it collapses. The proposed rocks encipher information representing the landscape found during the human centered epoch. With the encapsulated audio wave terrains of earcons, globalized capitalism’s lack of language barriers is portrayed. Thus the rocks have a binary function – both as a means to communicate the functionality of a product to the speculated future user and as a contributor to the Anthropocene audio ecology, where corporations compete for attention by producing ever more mesmerising sound signatures.

1 **A plastoglomerate is a stone made up of natural debris such as sedimentary grains and hardened molten plastic. The term was proposed by Patricia Corcoran, Kelly Jazvac and Charles Moore, *An anthropogenic marker horizon in the future rock record*, 2013**

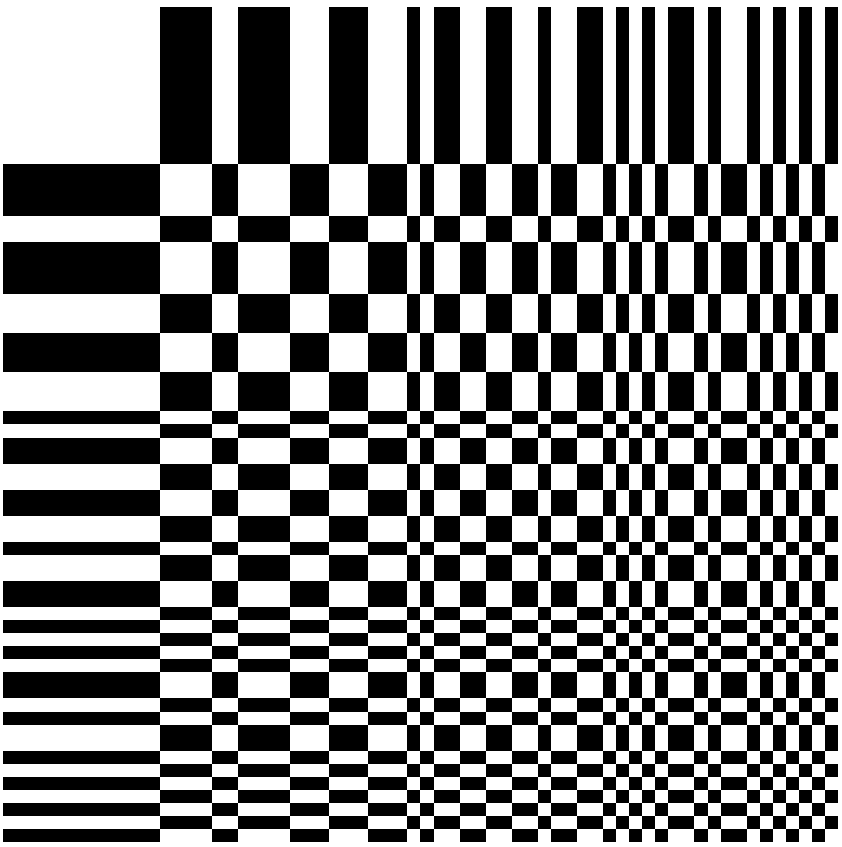


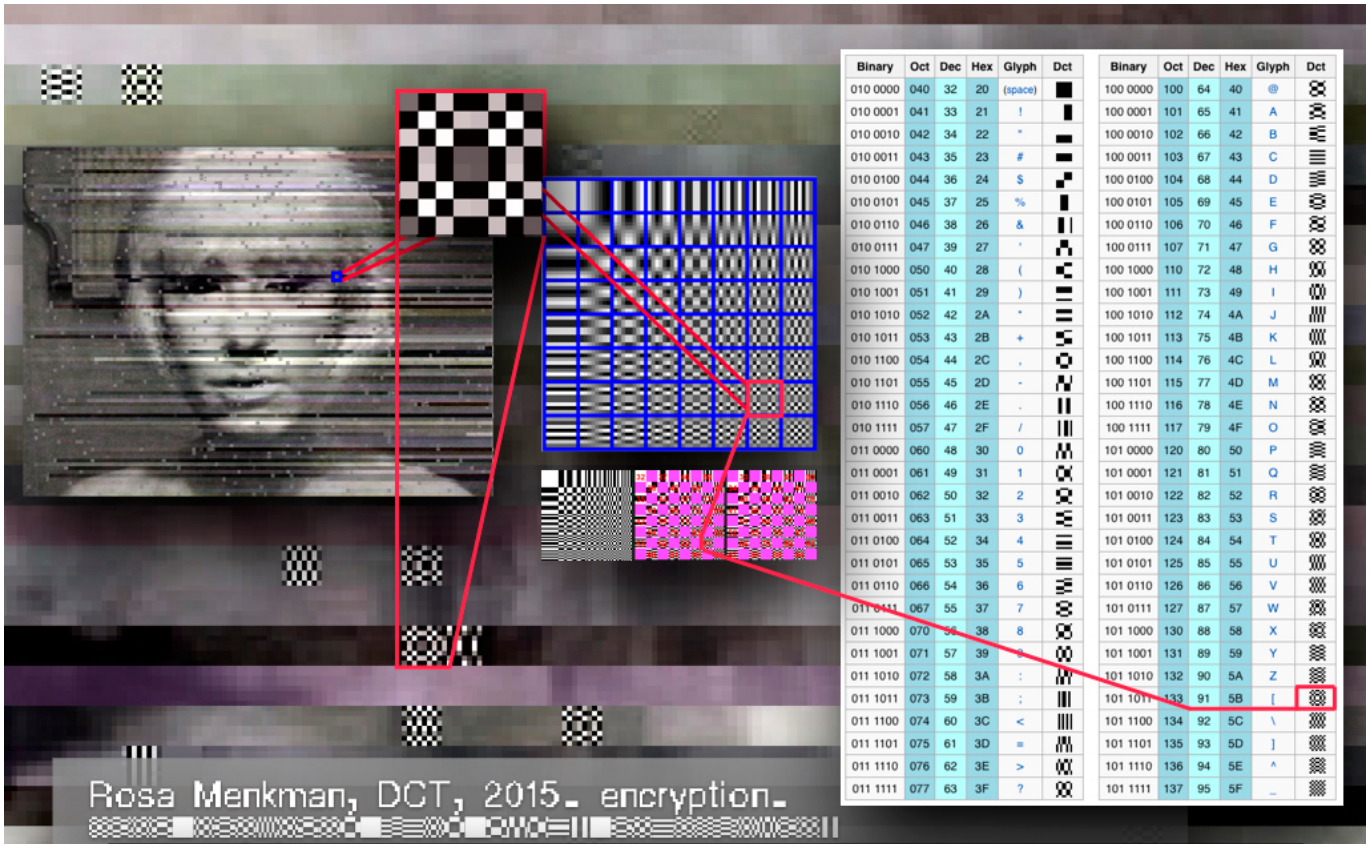
Rosa Menkman Author	How Not to be Read (a recipe using DCT) Project	2016 Year

#recipe	#sense	#break
Format	Theme	Action

Recipe for using the aesthetics of JPEG macroblocks to mask a secret message as error

HOW NOT TO BE READ (A RECIPE USING DCT)





Binary	Oct	Dec	Hex	Glyph	Dct
010 0000	040	32	20	(space)	
010 0001	041	33	21	!	
010 0010	042	34	22	"	
010 0011	043	35	23	#	
010 0100	044	36	24	$	
010 0101	045	37	25	%	
010 0110	046	38	26	&	
010 0111	047	39	27	'	
010 1000	050	40	28	(	
010 1001	051	41	29	)	
010 1010	052	42	2A	*	
010 1011	053	43	2B	+	
010 1100	054	44	2C	,	
010 1101	055	45	2D	-	
010 1110	056	46	2E	.	
010 1111	057	47	2F	/	
011 0000	060	48	30	0	
011 0001	061	49	31	1	
011 0010	062	50	32	2	
011 0011	063	51	33	3	
011 0100	064	52	34	4	
011 0101	065	53	35	5	
011 0110	066	54	36	6	
011 0111	067	55	37	7	
011 1000	070	56	38	8	
011 1001	071	57	39	9	
011 1010	072	58	3A	:	
011 1011	073	59	3B	;	
011 1100	074	60	3C	<	
011 1101	075	61	3D	=	
011 1110	076	62	3E	>	
011 1111	077	63	3F	?	

Binary	Oct	Dec	Hex	Glyph	Dct
100 0000	100	64	40	@	
100 0001	101	65	41	A	
100 0010	102	66	42	B	
100 0011	103	67	43	C	
100 0100	104	68	44	D	
100 0101	105	69	45	E	
100 0110	106	70	46	F	
100 0111	107	71	47	G	
100 1000	110	72	48	H	
100 1001	111	73	49	I	
100 1010	112	74	4A	J	
100 1011	113	75	4B	K	
100 1100	114	76	4C	L	
100 1101	115	77	4D	M	
100 1110	116	78	4E	N	
100 1111	117	79	4F	O	
101 0000	120	80	50	P	
101 0001	121	81	51	Q	
101 0010	122	82	52	R	
101 0011	123	83	53	S	
101 0100	124	84	54	T	
101 0101	125	85	55	U	
101 0110	126	86	56	V	
101 0111	127	87	57	W	
101 1000	130	88	58	X	
101 1001	131	89	59	Y	
101 1010	132	90	5A	Z	
101 1011	133	91	5B	[	
101 1100	134	92	5C	\	
101 1101	135	93	5D	]	
101 1110	136	94	5E	^	
101 1111	137	95	5F	_	

Mesmerised by the screen, following the moves of the next superhero, I was conditioned to ignore the dust imprinted on celluloid and floating through the theatre. The dust that touched the light of the projection and the dust floating towards nowhere.

Dust that made up tiny universes of plant, human and animal fibres, indefinitely mixed with particles from burnt meteorites, volcanic ashes and soil from the desert.

...I never payed attention.

The JPEG compression involves 6 subsequent steps. These steps can be found not only on Wikipedia, but additional reflections can also be found in work made by artists such as Cory Arcangel (On Compression), Ted Davis (http://ffd8.org/) and by Paul B. Davis (Codec).

During the most important step of the JPEG algorithm, the compression employs a mathematical technique known as Discreet Cosine Transform, to compress the amount of image data needed to transport, store, and present the image. DCT consists of a finite set of patterns, called macroblocks, that can could also be described as a set of 64 glyphs, which, through the addition of 'intonation', by luma- and chroma-values, make up the JPEG image. If an image is compressed correctly, its macroblocks become 'invisible'. The incidental trace of the macroblocks is generally ignored as artifact, impurity of the image or error. Keeping this in mind, I developed DCT.

A resolution determines what is read and what is not.

DCT uses the aesthetics of JPEG macroblocks to mask its secret message as error. Because the legibility of an encrypted message does not just depend on the complexity of the encryption algorithm, but also on the placement of the data of the message. The encrypted message, hidden on the surface of the image is only legible by the ones in the know: anyone else will ignore it like dust on celluloid.

RLE stands for Run Length Encoding, a step within the JPEG compression that involves arranging the image components via a zigzag order. 010 000 – 101 1111 refer to the binary values of the 64 most used ASCII glyphs

How Not to be Read, a recipe using DCT:

- To prepare the JPEG you want to write your secret message on: choose a lofi JPEG base image on which macroblocking artifacts are slightly apparent. If necessary, you can scale the image up via nearest neighbour interpolation, to preserve hard macroblock edges of the base image.
- Download and install the DCT font -Positioned your secret message on top of the JPEG. Make sure the font has the same size as the macroblock artifacts in the image
- flatten the layers (image and font) back to a JPEG. This will make the text no longer selectable and readable as copy and paste data.

THE HONESTY OF EXTRUSION

"IN TERMS OF A PURELY EMPIRICAL UNDERSTANDING OF THE SUPERFICIAL AESTHETIC OF 3D PRINTING, THE 'IMPOSSIBLE AESTHETIC' IS ALMOST THE ANTITHESIS OF THE 'EXTRUDED AESTHETIC'."

Beyond prototyping, the current[1] crop of non-industrial 3D printers (domestic, personal, desk-top etc.), offers little or no Relative Advantage[2], other than for artistic[3] purposes. Most output is either part of a larger process, requires post-printing finishing or simply shouldn't be printed (and prototyping, by its very nature, is part of a grander scheme).

There is no doubt that the quality and structural integrity of 3D printed output will improve, to the extent that functional, ready to use objects will (eventually) emerge straight from the print-bed. For now, however, the structural integrity of many 'fresh prints' is only suitable for prototyping.

The forward-march of 3D printing is engineering structural integrity into the printed artifact and engineering the superficial aesthetics out of the printed artifact, and FDM/FFF seems to be on the wrong side of this evolution.

The Superficial Aesthetic of 3D printed Artistic Output

The term *aesthetic* has myriad meanings (Koren, 2010), one being 'artistic nature' which is explored further in the more expansive research from which this essay is drawn[4] ; another definition describes those attributes that are 'sensed', or: what is seen, heard, felt, smelt and tasted. As little 3D printed artistic output is, as yet, designed for the appreciation of its taste, smell or sound, the Superficial Aesthetics considered here are visual and tactile.

Layers are intrinsic to 3D printing, however the 'layered look' is essentially the aesthetic of the code rather than the output. Fused Deposition Modelling (FDM) – or more correctly Freeform Fabrication (FFF) has a seemingly layered aesthetic, however it is not the actual stl. code that dictates the appearance of these striations, it is a combination of the extrusion nozzle and the rheology of the non-Newtonian fluids, such as clay slip and molten polymers, being expressed through it. The internal residual stresses dictate the curved surface meniscus of the solidifying form and this particular *Extruded* Superficial Aesthetic can never be engineered out of the actual printing process. As resolutions get finer and finer (but never fine enough to avoid those unwanted 'surface issues', largely pertaining to hygiene,) the print time will get slower and the process will be superseded by an alternative 'evolved' 3D print technology such as Digital Light Processing (DPL), that gains the crucial 'Relative Advantage'. There are also gravitational issues which, regarding the structural integrity of lower layers of an extruded structure, will always cause limitations to printing speed for the FFF process (Perrot et al., 2016.)

The second recognisable Superficial Aesthetic (SA) in 'non-industrial' printers is the slightly blurred, sand-stone appearance produced by many 'sintering' and 'jetting' machines; expiring patents will be responsible for the on-coming proliferation of these machines at relatively affordable prices, along with print-bureaus that attract customers with sand-stone effect, bastardisations of Mobius strips and streaky bacon. This *granular* 'flaw' will either be engineered out of these machines, or they will be superseded by printers that lay down material in diaphanous mists, barely atoms thick. Either way, the mantle-pieces of the future can look forward to being adorned with glorious family portrait statuettes in sharp focus, or possibly a Yoda, so detailed that it looks like 'genuine merchandise'.

Impossibility could also be considered a superficial aesthetic of 3D printing, however, a degree of prior knowledge about manufacturing viability is required, in order to appreciate the usual infeasibility of the artifact in question. In terms of a purely empirical understanding of the Superficial Aesthetic of 3D printing, the 'impossible aesthetic' is almost the antithesis of the 'extruded aesthetic'. Printing a 'Gyroid'[5] in one piece, or even a whistle with a loose pea inside it for that matter, intrigues the viewer at first, but the novelty wanes by the time the third or fourth mathematical abstract has be made manifest. The curious appeal is in the cleverness of the process, and once that has been figured out and understood, the novelty wears off. *Extruded 3D Printed Artistic Output* offers no such intrigue.

Artistically, the printing of impossible things merely demonstrates the technology, whereas extrusion (largely because of its honesty) can use the technology to demonstrate the art; which is the point at which the Stephen Hoskins considers that the technology has gained artistic credence (Hoskins, 2013. p. 78)

1 **Midway through the second decade of the 21st Century**
2 **Relative Advantage, as those familiar with Roger's Diffusion Theory will be aware, is the main driver of most human behavior (i.e.: what's in it for me?) (Rogers, 2003)**
3 **Artistic out-put is largely identified by the maker and interpreted by the viewer; art status is usually conferred by those who believe they know better. There is much 3D printed output that will lay claim to artistry; this essay neither refutes nor supports these claims but will refer to all that presents itself as such, as 'Artistic Output'**
4 **Doctoral thesis entitled** *The Nature and Aesthetics of 3D Printed Artistic Output*
5 **www.bathsheba.com/math/gyroid/**

Figure 1. Extruded Object i (Catherine Scott 2015)

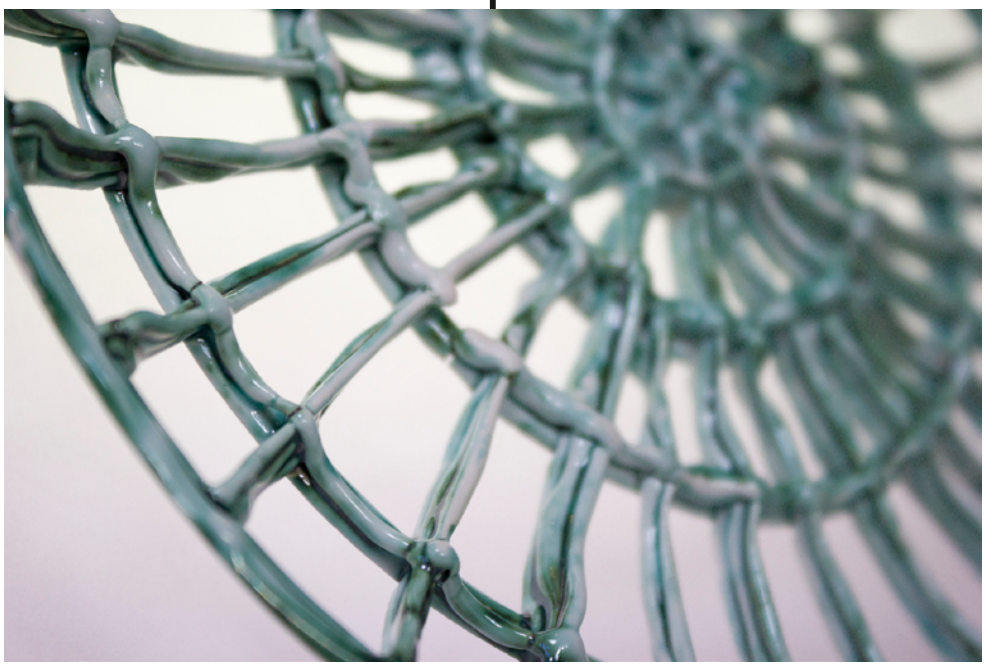


Figure 2. Web of Bones – Extruded Object ii (Catherine Scott 2015)

The Superficial Aesthetic of extrusion is particularly honest

Relative advantage has already been cited as a driver/barrier in the uptake of 3D printers. If the hardware can perform a task better than an existing process, the machines will successfully diffuse. However, finding a unique task for these machines eliminates the need for relative advantage. Rather than trying to force the technology to take on tasks at which it cannot yet compete, new avenues should be sought for 3D printers, but it is unlikely to be the hardware developers that dictate any novel use (much like Tim Berners-Lee did not have 'cats doing hilarious things' at the forefront of his intentions when he gifted us the Web). Instead it will be experimental users, possibly those exploring the machines as craft-tools and even as an artistic medium in its own right.

There is the potential to exploit the extruded aesthetic, largely regarded as a flaw, by exaggerating it and lowering the print resolution to uncover the very essence of the material construction. Laying bare form in this way is not unusual.

Skeleton watches, exposed brickwork, visible building services and even television programmes about 'how it's made' all communicate visually, *how* an object exists, the observer uses the superficial aesthetic to create their own understanding, taking a constructivist approach.

The extruded 3D printed aesthetic explains the growth of an object, like the annual rings of a tree, the rapidly marked skin of an expectant mother or even geological superposition that allows archaeologists to trace time, back through millennia. Work such as Dave Lobser's *Experimental G-Code*[6] ; Dirk Vander Kooij's chairs[7] ; Oliver van Herpt's experiments with randomness in ceramic printing[8] , and Emerging Objects' GCODE.Clay project[9] , all wear the evidence of extrusion with pride.

It is within this honesty that the aesthetic of #Additivism may lie. This exposure is without guile or trick or disguise. Of course the 'nature' of the artistic output can be something entirely different, depending on what the artist is trying to communicate – i.e. why it is, but the Superficial Aesthetic is all about 'how it is'. The SA is understood purely on what is observed in the output and as such, the specific manufacturing process becomes irrelevant and the aesthetic becomes independent. The observer may, or may not, know what 3D printing is, they may assume that a 3D printed artifact has been made by some other method, or they may look at an extruded object and assume it has been generated from code. Much like a contemporary child, expertly versed in 'Minecraft', might describe the superficial aesthetic of an unfamiliar Richard Paul Lohse, or Paul Klee painting as 'pixelated'.

The independence of the Superficial Aesthetics of 3D printing

This independence can be understood through the lens of 3D printing, however, the broader lens of #Additivism allows both the artist and the observer the freedom to communicate and understand without condition (and even without a 3D printer.) Figs. 1 & 2 are both earthenware objects, both have an Extruded Superficial Aesthetic and one is named *Web of Bones*, for no reason other than that is what it looks like. Both are explorations of control versus randomness, and part of a larger body of research, but no observer needs to know that to draw their own, completely legitimate, meanings from the pieces.

Catherine Scott is a PhD candidate at Ulster University, researching The Nature and Aesthetics of 3D Printed Artistic Output. A Ceramicist and former Architectural Technologist, she is currently an Associate Lecturer in Design and Sustainable Innovation at the Open University.

Hoskins, S. (2013) 3D printing for Artists, Designers and Makers. London: Bloomsbury.
Koren, L. (2010) which 'aesthetics' do you mean? ten definitions. California: Imperfect Publishing.
Perrot, A., Rangeard, D. and Pierre, A. (2016) 'Structural built-up of cement-based materials used for 3D-printing extrusion techniques', Materials and Structures, 49(4), pp. 1213-1220.
Rogers, E. M. (2003) Diffusion of innovations, 5th ed. New York: Free Press.

Image credit Fig 1&2: Claire Scott Photography

6 www.dlobser.com/Vessel
7 www.dirkvanderkooij.com/collections/collection
8 www.oliviervanherpt.com/3D-printing-ceramics/
9 www.emergingobjects.com/project/gcode-clay/

Ryan Hammond	Synthetic Hormonal History Map	2016
Author	Project	Year

#blueprint	#resistance	#morph
Format	Theme	Action

Reflections on the democratization of pharmaceutical production to enable personal ownership of biocaptial

SYNTHETIC HORMONAL HISTORY MAP

Because of it's hardiness, responsiveness to genetic transformation, and the abundance of knowledge we have on the plant, tobacco is often used for molecular pharming of vaccines and medicines. Could the development of a steroid hormone producing plant enable people to grow their own therapies – taking biomass to community extraction and purification facilities, and receiving cheap or free supplements in return? Can phytosterol rich plants such as soy and yams be metabolically engineered to produce progesterone, testosterone, and estradiol within their own tissues – skipping the step of extracting the phytosterols and fermenting in microbial bioreactors? As Synthetic Biology reveals new technologies and manufacturing possibilities which disrupt current practices, can we redesign ownership paradigms to create a society based on biological abundance? Can biohackers develop these technologies and dedicate them to the public domain before companies race to patent?

An algal bioreactor might be a desirable alternative to a slow-growing tobacco or soy system, while retaining the benefits of being photosynthetic (not needing added sugar, being less susceptible to contamination).

Automated Solid phase extraction for purification of hormones from urine could enable personal ownership of hormonal biocaptial. Could a home extraction unit enable partners or friends to share hormones? Could a bioapothecary/community pharmacy enable people to deposit the hormones they excrete and receive compensation? Would democratizing pharmaceutical production necessarily mean increasing patients' vulnerability to exploitation and quackery as was rampant in the early 20th century with organotherapy and other treatments? Or can we imagine new regulatory systems that aren't predicated on centralized manufacturing?

1849
Experiments demonstrate behavioral and physiological changes in chickens and capons (castrated roosters) after receiving abdominal testicle transplants.

1875
Lydia Pinkham's Vegetable Compound came onto the market – advertised to women for many of the ailments which were commonly treated with oophorectomy (removal of the ovaries) at the time. The compound was based off of a traditional recipe of plants containing phytoestrogens and other chemicals useful in the treatment of menstrual pains and menopause symptoms.

late 1800s
Ovaries were thought to cause hysteria, anorexia, anxiety, and 'nymphomania', oophorectomies were performed regularly to treat these conditions.

1889
Brown Sequard sets off an era of organotherapy after publicly claiming that an aqueous extract of animal testicles had increased his urine stream, revived his vitality, and boosted metal focus and clarity.

1889
The term hormone is first used, coming from the Greek hormōn meaning, 'to set in motion'

1912–1920s
Testicles are harvested from farm animals, prisoners, and people in asylums for transplantation into patients seeking treatment for ailments ranging from epilepsy, to anxiety, to sexual dysfunction.

1923
Hormones are purified from pig ovarian follicular fluid

1927
Oestrogen is discovered and purified from the urine of pregnant women.

1928
Progynon, a mix of conjugated oestrogen's extracted from the urine of pregnant women is marketed to women going through menopause

1930
Conjugated Oestrogens (protein bound) are discovered in the urine of pregnant mares and put on the market as orally active hormones.

1931
15mg of androsterone is isolated from 15,000 liters of urine from young police officers in Berlin

1935
Testosterone became commercially available in the form of testosterone propionate pellets, a short acting formula

1935
10mg testosterone is extracted from 100kg of bull testicles

1935
The chemical synthesis of testosterone is developed and published

1938
Ethinyl Oestradiol was synthesized, and the first synthetic steroid (Diethylstilbestrol) was discovered. Both are long lasting and highly active.

1943
A new method is developed for producing progesterone from the phytosterol called diosgenin: a cholesterol like substance abundant in wild Mexican yams.

1940s–1950s
From the 1940's to the 50's virtually all steroid hormones were produced from Mexican yam diosgenin. The Mexican government nationalized the yam and blocked export to monopolize the industry. All attempts to grow the yams in other countries were unsuccessful.

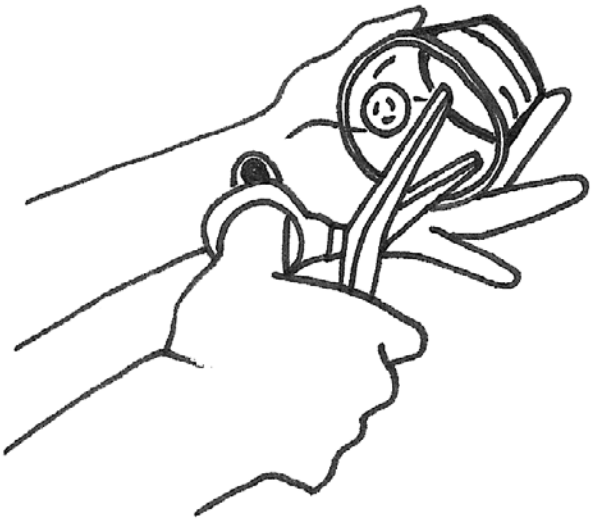
1976
The Mexican government raises Diosgenin prices by 250% prompting a shift to production of steroid hormones through microbial conversion of stigmasterol from soy plants.

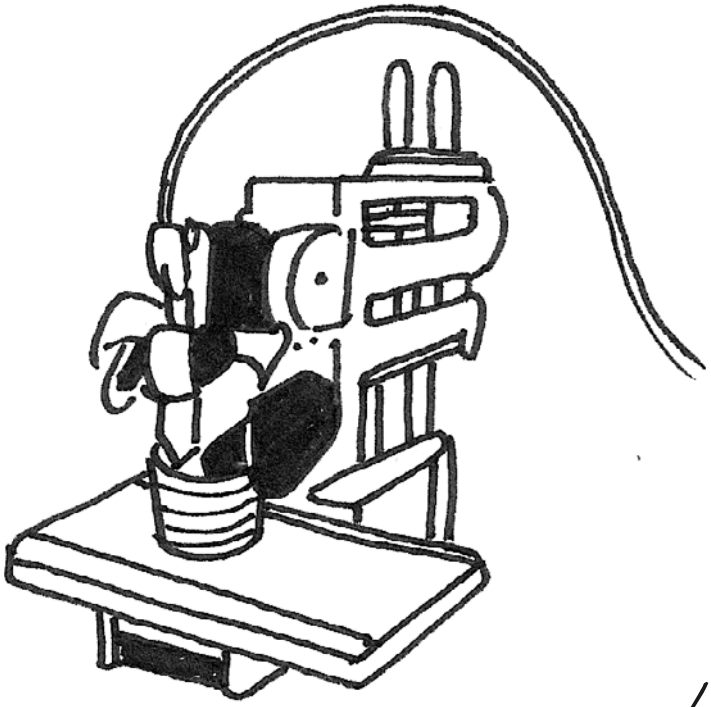
Keeley Haftner Author	Desktop Recycling: 3D Printing as Closed Loop Project	2016 Year

#recipe Format	#kipple Theme	#collapse Action

Recipe for creating 3D prints using found, disposable materials

DESKTOP RECYCLING: 3D PRINTING AS CLOSED LOOP





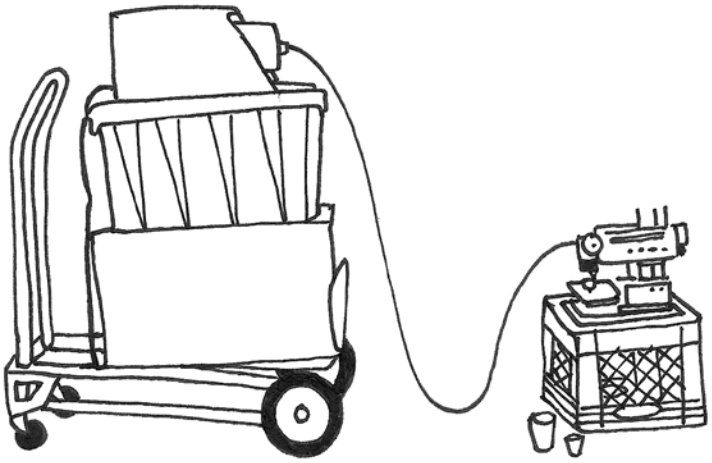
CLOSED LOOP 3D PRINTING

The initial investment in equipment can be daunting, but once you have invested in your larger items, your work from then on is completely cost-free! These items include: an extruder ($650-$1400), a heavy-duty shredder ($450+), and a 3D printer ($300-$2500).

The most important investment is your extruder. Many cities these days have public libraries or maker spaces where you can use 3D printers for free or for very little cost. You can put off the purchase of your Reclaimer as long as you need to and simply save your failed prints until you've acquired one. In the meantime a blender works great for rafts, thin prints, and light cups or bottles.

Ingredients:

- Used PLA cups*
- Soap or dish gloves and dish cloth
- Rack (for drying cups)
- Large scissors (that you don't mind dulling)
- Blender (that you don't mind abusing)**
- Filament extruder (I use the Filabot)
- Digital calipers
- Digital scale (optional)
- FDM*** 3D printer with fan for PLA^
- 'Reclaimer' for failed prints – see step 9



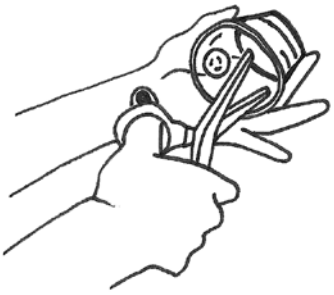
***Marked with #7 PLA, and/or 'industrially compostable'**
****I found my blender using Freecycle.org. Also check the free section of Craig's List/second-hand stores**
*****Fused Deposition Modeling – the Cartesian hot glue gun**
^If you are planning to invest in your own 3D printer, get one with a heated platform and a fan so that you can do both PLA and ABS printing

Steps:

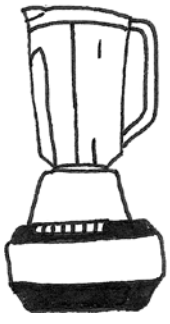
1. Collect: Collect used, disposable PLA cups. More and more smoothie joints and cafés are using them. They are marked with the #7 PLA identification code, or with the term 'industrially compostable'.

2. Wash: Because other people have eaten/drunk from these items, it is wise to use dish gloves and let the cups soak for a bit before washing. Diligently remove all foreign matter, like food or stickers. Make sure they are thoroughly dry before proceeding to step 3 – moisture will negatively affect the extrusion process.

3. Cut: Cut into approximately 1"-2" square pieces

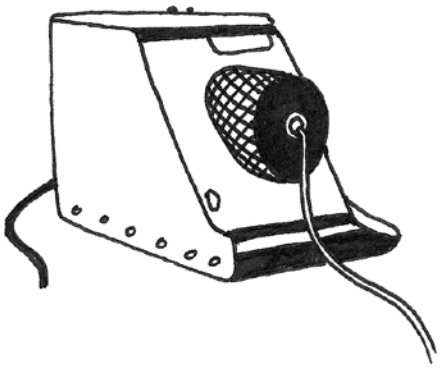


4. Blend: First on a lower speed and then higher speed until you have well-shredded 'shrapnel' with no larger pieces. Your aim is to achieve the overall effect of virgin plastic pellets, which are akin to small plastic beads.

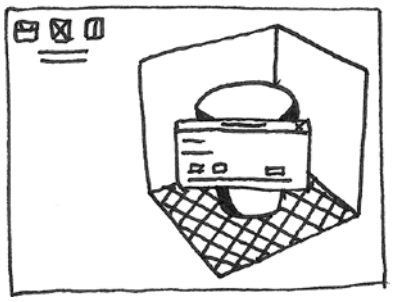


Steps:

5. Extrude*: Every extruder is different, and each comes with intensive instructions of how to operate them. Getting the right diameter (1.75mm) can be tricky, but it's important to get the hang of it or your 3D printer may not be able to feed the filament through. Remember: you can always re-cut/blend failed filament and feed it through the machine again, so there is no harm in trial and error! Digital calipers are necessary to gauge the diameter accurately.



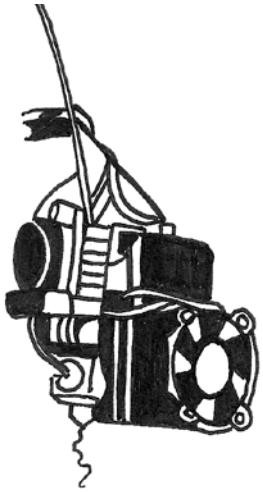
6. Get STL File: Download or create your own by scanning or fabricating digitally. Tinkercad is an excellent free online resource for beginners, and Thingiverse has tons of open-source free downloads. Use Cura or your favorite 3D print software to estimate how much filament you will require. Weigh or measure your filament to ensure you have the correct amount (with some extra, just in case).



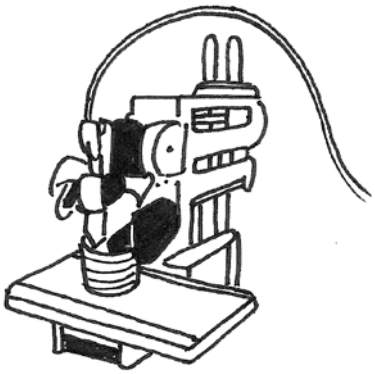
*WARNING: best practices are important here - PLA is considered a safe plastic to melt but little research has been done to as to the nature of the plasticizers in PLA, or to confirm its long-term effects beyond doubt. Err on the side of caution and work in a well-ventilated space, and possibly consider wearing a NIOSH-rated vapor mask.

Steps:

7. Heat printer/load filament: Use a raft whenever possible to help the print adhere to the platform. Remember, this and other scraps can also be remade into new filament. Keep a collection bin for scraps to use for your next batch.

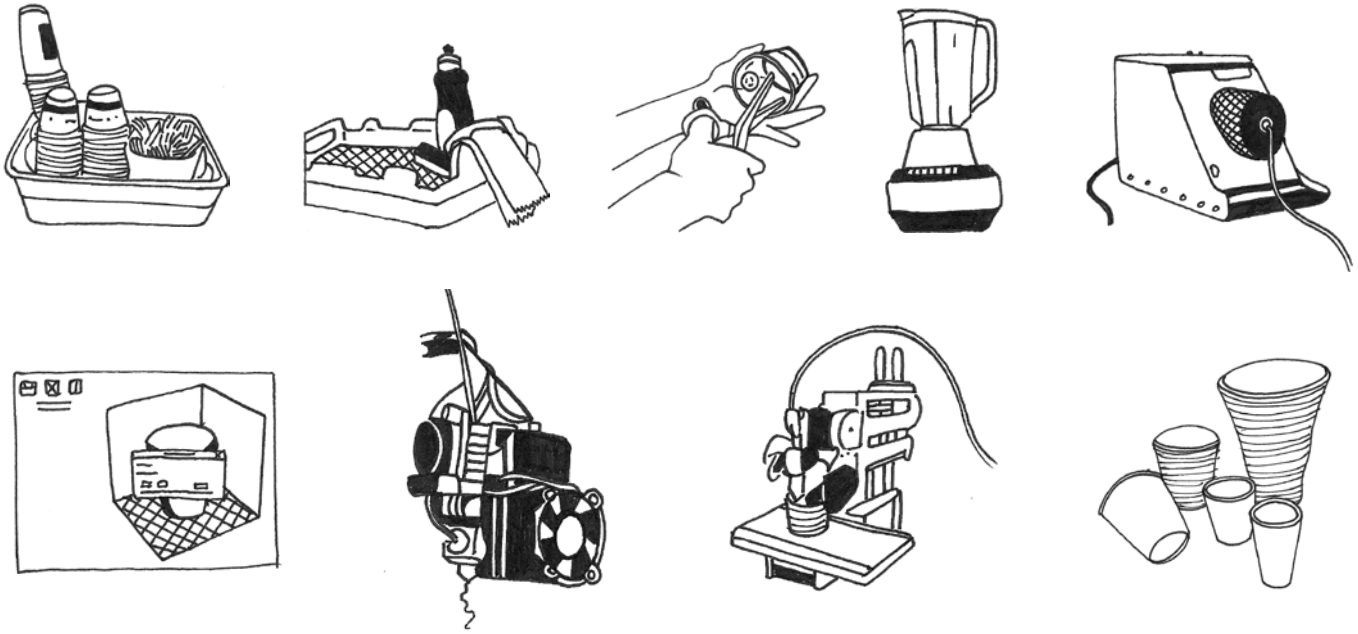


8. Print!



9. Destroy and remake filament: Failed or detestable print? Not to worry. Use your "Reclaimer" or equivalent technology to break down the print and extrude again as new filament. In 2016, 'heavy-duty shredders' are hard to come by, and expensive because of their custom steel parts. Hopefully that will change. For now, be on the hunt for a robust shredder that you can modify or use for this purpose (a meat grinder? An industrial food processor? Steer clear of wood chippers and paper shredders). Remember, you are a maker! Be creative, and share your results!

Congratulations!
You now have a closed-loop desktop recycling system for 3D printing. Rinse and repeat, and never buy materials again!



This recipe goes through the materials, methods, and results of the artist's process of taking industrially compostable PLA cups from cafeterias, converting them into 3D printing filament for additive manufacturing, and printing denser cups from that filament. The cycle, in theory, could be an ostensibly endless closed-loop with the addition of a final piece of robust equipment that could break up the resultant printed cup. Once again in shrapnel form – a form similar to virgin plastic pellets – the cup could then be fed back into the filament extruder to produce subsequent filament and cups, thus completing the loop. Unlike SLA printing (stereolithography), which uses thermoset plastic that cannot be recycled, FDM printing (fused deposition modeling) uses thermoplastics like ABS, PLA, and PET, which can be remelted and reused almost indefinitely.

Now is an opportune moment to address the so-called 'plastic junk' produced by 3D printing that is a key point of criticism for additive manufacturing. Opinions around the topic are extreme – articles often portray 3D printing is either the romantic site for the modern industrial revolution of 'makers' who harken a future era, or as yet another elite frivolity producing unnecessary consumer garbage.

The reality is a complex state of in-between. The majority of FDM prints are made using PLA (polylactic acid), a waste product from agricultural industry typically recouped from corn and sugar production. It is 'industrially compostable', which means exactly what it implies: that on an industrial scale, it can be composted. Industrial composting consists of mounding large-scale piles of organic matter and dirt, allowing these materials to combust and reach high temperatures. These piles are overturned and cycled with large-scale equipment until the matter has broken down entirely and become soil. PLA cannot be composted in backyards, it contaminates recycling streams when lumped in with other recyclables, and it has the same (nearly infinite) lifespan as other plastics if it ends up in the landfill, the ocean, or as litter on the ground. Because 3D printing typically doesn't involve embedding the SPI (Society of the Plastics Industry) Identification Code number onto your print, it's safe to say that these plastics rarely, if ever, end up where they're meant to go. But they could, if people knew more. This only speaks to the complications of using PLA to make 3D prints, not to the other plastics that are nearly as commonly used, like PET, ABS, nylon, etc.

This work looks to stimulate conversation around small-scale plastics manufacturing, debunk myths around FDM printing's nature and potential, and offer up a complicated 'solution' to the wildly problematic production of disposable waste in North America and worldwide. Systematic policy decisions enacted in the United States have global affects on what and where disposables are made, how much and how often they're produced, and where they end up once they are called into being. And yet moralist consumer guilt is often used as a tool to shirk responsibility for these political and economic decisions, which is exemplified in the rhetoric around recycling, the restriction of water and power use, and other bandage solutions to systemic problems. Additive manufacturing and other novel technologies are often marketed to consumers as solutions to self-destructive human behavior. Through the act of creating a consumer-scale recycling plant in my studio using cutting-edge technologies to produce objects of limited use, I hope to question the efficacy of the consumer as redeemer, in favor of collective re-examination. But as a passionate producer of objects, I also celebrate the power of the maker, both to contribute to collective solutions, and to take issues into her own hands.

UNIVERSAL ENZYME

“I CAN HAVE A THOUSAND LEGS, OR NONE AT ALL, BUT MANY TRUNKS, OR A SLOPE. I CAN BE AMORPHOUS, ANY GENDER, ANY SPECIES, EVERY SUBSTANCE. I CAN BE A WE.”

Things are going to slide, slide in all directions
Won't be nothing
Nothing you can measure anymore
The blizzard, the blizzard of the world
has crossed the threshold
and it has overturned
the order of the soul

– from Leonard Cohen, *The Future*

The universe is dying.

Certain parts of it are simply dying more slowly than others.

Eternity is an aspirational concept, like light speed. One can only draw this much closer to it, never quite getting there.

The parts of our universe that will survive the longest, and may even manage to squeeze through the tiniest of cracks, pinhole sized wormholes between this dying universe and fresher ones, are those smallest bits of energy carrying nothing but information .

Our own sapient simian species has been acting, for the most recent bleep in its short existence, as a universal enzyme, digesting and transmuting matter, life, and ideas into the ephemeral universal substance, encoded information. This may be seen as a blind drive towards the ultimate possibility for survival of the species, everything from flesh to concrete riding the upwards curve towards eternity as bits of light, not blobs of matter.

Now

We have (some of us) entered the pixelated age, the time of accelerated and additive production.

Now

We are (some of us) at a turn, a fuzzy merging of trajectories. The age-old urge to see and distill an essence, a complete understanding of anyone and everything (think about animistic rituals, surgical theater, reincarnation cults, psychoanalysis, astrological charts, phrenology), is finally colliding with the technologies that espouse to enable us to do just that (think about DNA testing, 3D scanning, full city surveillance, data logging, packet sniffing, mass spectrometers).

The result is the project of Total Capture. It has already begun, though erratically, uncoordinated. It moves past this point, gathering force, direction, intention. A panoply of parts come together in a series of tactics, methods and mechanisms, their ultimate goal the encoding of the complete information-specter of the world.

Some key systems of Total Capture, and their consequences are:

Capture Agglomerator: accepts all available data sources about a specific object. Processes a congealed stack of 2,3,4D scans, point clouds, footage, recordings, readings, sensings, histories, and all layers of encoded information within the object (e.g if it's a smartphone, all electronically stored information from within it will be gathered alongside its physical form). Generates an info-specter of the object. The Agglomerator may be realized as a meeting, a physical place, a combination of devices, or a solitary machine.

Destructive Bio Scanner: thoroughly scans the deep tissue of any biologically based object, while literally digesting it, resulting in both a usable info-specter and a 3D printable pool of bioplastic. In a world as precariously perched over the abyss of ecocide, the use of all manner of destructive scanners is encouraged. Better to fill the world with ghosts than to turn it into a corpse.

Universal Tag Vector System: A series of viruses (for bio-matter), or self-replicating nanobots (for inorganic matter). These are made to eventually infect everything. Every tree, every leaf, every animal, every pebble, every pool of water becomes a fully networked, self-reporting cluster of nodes on the universal tag system. Of course, all manufactured goods at this point are already a part of this system. The viruses and the bots communicate ceaselessly, filling the bionetworks and the airwaves, the ground and the waters with their minuscule exchanges, maintaining a common code, a constantly up to date, real time, fully fleshed-out digital doppelganger, the Ghost of the World. The Ghost is not a simulation: it is the total image of the world, doubled, dispersed in a planetary-scale cloud of interconnected, microscopic data-centers.

With the Ghost of the World in place, all access is enabled to all things (all things that have been tagged, and now possess a digital soul).

With bioplastics as the vehicle, personal and functional objects may be recalled and dissolved, as can entire structures. Other, older edifices and public monuments may be allowed to fall into ruin

or even accelerated in their demise, pulled apart for increasingly rare raw material, to be replaced by the glowing, forever perfect, ethereal clone of their perfect form (only visible by those that are tapped in, modified, with access to the global network). Endless fluidity over time becomes a possibility: a structure, an object may be reconstructed as any combination of its form over any period or combination of periods in time.

With the Ghost of the World in place, one (who has the privilege of access) can finally and fully tap one's senses, their awareness, into the whole and the partial nature of objects, or into the fully tag-infected bodies of others, that may tap back into you in return, all via the universal network, as facilitated by the Ghost. If I am tapped in, and the cells in my body and the cells in the tree are speaking to each other, I can for a moment be a tree, and the tree can be me. The world becomes simultaneously as interconnected and as dispersed as a morass of random access bits, tenuous connections forming and dispersing between physically disparate groups of nodes. So that not only can I switch my whole sense of being with that of a tree, I can do so in whatever arbitrary fractionality that I choose. My right index finger can be a leaf, my left eye, an airplane en route to Tokyo, my guts the sewer system of a medium sized city in the Persian Gulf. I can eat what my parents are eating in the Middle East, and sit with one leg on a concrete bench in a city plaza, and another dangling in a river. I can have a thousand legs, or none at all, but many trunks, or a slope. I can be amorphous, any gender, any species, every substance. I can be a We.

Perhaps this newfound distribution of consciousness promotes a redistribution of resources. Perhaps the nature of the experience is such that it promotes utter empathy between all fellow beings, human and non-human. But it is quite possible (more possible) that it will not. That this ghostly world with all that it enables, will preserve and even exaggerate the inequities of the old, hardcoded source, or will generate new ones.

With the Ghost of the World in place, the long process of digestion will have ended, one step closer to eternity, or as close as it gets for us humans.

With the Ghost of the World in place, we will no longer be referred to as human.

ADDING TO SUBTRACT: 3D PRINTER RECIPES TO DISRUPT OUR DESIRE FOR MORE

"THE FOLLOWING TWO RECIPES ARE ADDITIVIST PROPOSALS TO INTERVENE IN THE CULTURE OF MORE."

For years 3D printing has been expected to democratize manufacturing. By extruding a bead of plastic layer by layer, this technology lets individuals create physical objects from virtual models. But what ideologies are embedded in this endless stream of processed petroleum? Does 3D printing free consumers to be creators or does it reinforce existing power structures? What is the relationship between capitalism's need for growth and the 3D printer's need for more plastic? With the following paragraphs I argue that additive technologies reflect, support, and extend a culture that always craves more, and propose two additive recipes that aim to neutralize this cultural imperative.

We live in an era of constant measurement. Our actions are both driven and evaluated by numbers. This often starts with school, where children's academic performance is assessed using test scores. Our accountability grows as our bodies do. Amazon tracks every second its workers spend to retrieve and ship a product.[1] Corporate managers are ranked against each other using measurements of productivity.[2] Health insurance companies utilize numbers to surveil patient compliance with prescribed treatments before supporting or declining claims.[3] In other words we are constantly assessed, tracked, ranked, and surveilled through metrics.

Technology – particularly software – has expanded and accelerated a shift into audit culture. It is software that gathers the metrics necessary to evaluate worker efficiency or patient health. But it is not just our actions in physical space that are tracked in these ways. Software collects, stores, analyses, and reports on every aspect of daily life, determining what we see and who sees us. The number of 'likes' we click on Facebook changes the content of our news feed.[4] The amount of email we send to overseas family members affects the likelihood our email is read by an NSA analyst.[5] Neoliberal ideology asks us to consider every interaction as a transaction. Every action has a value, and this valuation governs our lives.

Audit culture wants more. In everything from worker productivity to actions on Twitter, more is better than less. If we create more widgets per hour we rank higher than our peers. If we get more followers on Twitter, our speech reaches more people. Capitalism is a world system that requires an endless growth of products and consumers.[6] This need for growth informs everyday life and drives a collective desire for more.[7]

3D printing is a technology in ideological alignment with – and thus supportive of – audit culture. Just as this era of measurement drives us to excel in metric terms, 3D printing technology manifests in physical space as a fetishisation of addition. 3D printing is an additive process that builds objects through the accumulation of layers of material. Just as a Facebook user without regular new posts becomes less visible to their friends, a 3D printing process without addition builds nothing. Just as corporate manufacturing enables the production of new material products without caring for the old, 3D printing lets everyone transform oil into plastic objects that will never go away. Additive manufacturing thus reflects and fuels capitalism's need for growth, and reinforces the imperative it creates: more is better.

How might we use the ideology of the 3D printer against itself? 3D printers are being used to create everything from printouts of our heads to one-off parts for obsolete machines. Additive manufacturing helps multinational corporations prototype new products meant for millions (or billions) while also enabling the creation of short-run objects for the long tail[8] (further enhancing capitalism's creation of and reach into new markets). Can we use the additive mechanism of 3D printing to disrupt the control of and our accountability to audit culture? Can we print objects that limit accountability structures, mechanisms, directives, and interfaces? Put another way, can we add to subtract?

The following two recipes are additivist proposals to intervene in the culture of more.[9] The first is ready to bake today, enabling personal action against found metrics within physical space. The second is speculative, imagining an eventual post human blend of additive technologies with the body that could suppress audit culture by disrupting our reliance on metrics in everyday life.

1 Kantor, Jodi and David Streitfeld. 'Inside Amazon: Wrestling Big Ideas in a Bruising Workplace', The New York Times, Aug 15, 2015.
2 See Welch, Jack and John Byrne, Jack: Straight from the Gut (New York, NY: Warner Business Books, 2001), for a description of 'forced ranking' used in corporate management.
3 For example, see Schwab, Richard J. et al. 'Continuous Positive Airway Pressure Adherence Tracking Systems', Am J Respir Crit Care Med Vol 188, Issue 5, pp 613–620, Sep 1, 2013. 5, pp 613–620, Sep 1, 2013.
4 Bucher, Taina. 'Want to be on the top? Algorithmic power and the threat of invisibility on Facebook', New Media Society 2012 14: 1164, originally published online 8 April 2012. DOI: 10.1177/1461444812440159.
5 Savage, Charlie. 'N.S.A. Said to Search Content of Messages to and From U.S.', The New York Times, Aug 8, 2013.
6 Graeber, David. Debt: The First 5,000 Years (Brooklyn, NY: Melville House, 2011), 346.
7 I discuss this concept of a 'desire for more' at length in: Grosser, Benjamin, 'What Do Metrics Want: How Quantification Prescribes Social Interaction on Facebook', Computational Culture, Issue 4, 9 November 2014.
8 Anderson, Chris. 'The Long Tail', Wired, October 2004.
9 Allahyari, Morehshin and Daniel Rourke. 'The 3D Additivist Manifesto', 2015.

Recipe 1: Print Metrics to Hide Metrics

1. Find metrics in your physical environment. These might be numbers on a sign that track the meters to the next McDonalds, the current state lottery total, or, with today's networked and animated billboards, the hours, minutes, and seconds left until the nearby Dunkin' Donuts opens.

2. Measure the height and width of the metrics.

3. Photograph the sign with its metrics clearly visible.

4. Use a font identification app to determine which font was used to print the metrics.

5. Create numbers with that font that match the photographed metrics using a vector drawing app, import them into a 3D printing program, and extrude as appropriate.

6. 3D print the numbers at the previously measured height and width.

7. Spray paint the numbers to roughly match the original color of the metrics in the photograph.

8. Affix the 3D printed metrics to the sign so that they occlude – and thus, obscure – the 2D metrics. The choice of adhesive is yours, whether it's a temporary solution such as double sided tape or something more permanent like superglue.

9. Photograph the modified sign and post to social media using hashtags #addtosubtract, #hidethemetrics, and #additivism. Leave the numbers in place indefinitely.

Recipe 2: Print a Vision Manipulation System to Erase Metrics Everywhere

In 1945, Vannevar Bush imagined and described a number of technologies in his article *As We May Think*.[10] From 'dry photography' (digital cameras) to a camera on one's forehead (Google Glass), from 'associative trails' (hypertext) to the 'memex' (a personal database), Bush imagined future technologies based on need. Without knowing how these technologies might be assembled, he charted a future that includes them. His work was eerily predictive; as technology advanced, others started to create the very objects he imagined.

Science fiction also imagines new technologies of the future. In the movie *They Live*[11], a man discovers that earth's elite are really aliens disguised as humans. The aliens control society using hidden messages in mass

Illustration by Stephanie Lenchard Warren

media that encourage endless spending and acceptance of the way things are. The man's discovery is enabled when he finds a special pair of sunglasses that show the world as it really is, revealing the aliens' true appearance and the hidden messages everywhere.

These kinds of speculative designs[12] develop alternative visions of the future based on critical understandings of the present. With this in mind I now outline a future additive technology to radically neutralize everyday metrics. We already have 3D printers that output non-plastic objects, such as those that create biomaterials like bone, tissue, and cartilage. We also have experiments in bioelectric materials that combine electronics with tissue. Imagine a time when 3D printers can output a class of objects that integrate not only with the human body but the visual cortex. For want of a better term, I'll call these objects VISNIPS, short for 'VISual maNIPulators.' These objects, or more accurately, additively-produced bioelectronics, can be taught to manipulate visual information as it travels down the optic nerve. Some might use VISNIPS to insert new information into the visual data stream, creating an augmented reality that adds overlays with contextual information. But another use of the VISNIPS would be to augment vision by intelligently subtracting visual information. This subtraction could filter out all metric representations found in any medium viewed by the human eye. From metrics on a poster announcing the number of steps you should take each day to the quantifications in

10 Bush, Vannevar. 'As We May Think', The Atlantic, July, 1945.
11 They Live. Dir. John Carpenter, Universal Pictures, 1988.
12 Dunne, Anthony and Fiona Raby. Speculative Everything (Cambridge, MA: MIT Press, 2013).

social media interfaces tracking one's followers, the VISNIPS could intelligently identify and surgically erase each individual metric in our environment before each metric's visual representation is processed by the brain.

VISNIPS may take a physical form that suggests vision manipulation to others, such as a pair of metric-erasing glasses. In this way the VISNIPS would act as an inverse of the glasses in They Live; instead of showing a user the hidden messages that drive our behavior these glasses would remove the metrics that hide in plain sight. Another form might be more covert, such as a bioelectronic printed contact lens. Whatever form it takes, one could envision this technology supporting many types of artistic interventions beyond metric removal, erasing out undesired material such as propaganda in advertising or specific interface elements designed to encourage free labor in social networks. With any new technology it is important to consider not just its obvious benefits but also its embedded ideologies and biases. 3D printing technologies have been and will continue to be touted as a boon to individual maker culture, democratizing manufacturing by enabling everyone to be both engineers and entrepreneurs. But how are the designs of these 3D printers leading us to act and think? What points of view do they reinforce? I have argued that additive technologies both reflect and fuel capitalism's need for growth, reinforcing a collective desire for more. With these two 3D printer recipes I have provided blueprints to thwart that desire by additively creating an anti-metric that encourages – through the act of subtraction – alternatives to our culture of measurement, audit, and accountability.

Acknowledgements
The illustrations above are by Stephanie Lenchard Warren based on concepts from the author.

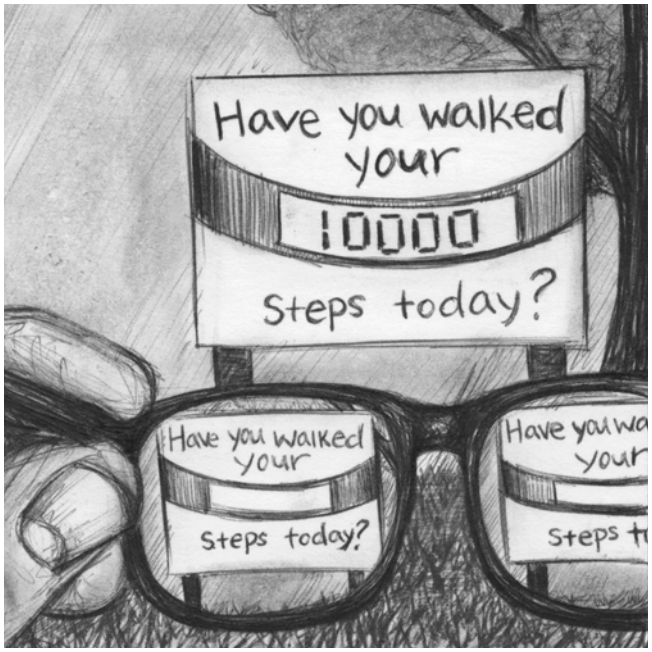


Illustration by Stephanie Lenchard Warren

Kayla Anderson Author	Future Reliquaries: Outposts Project	2016 Year

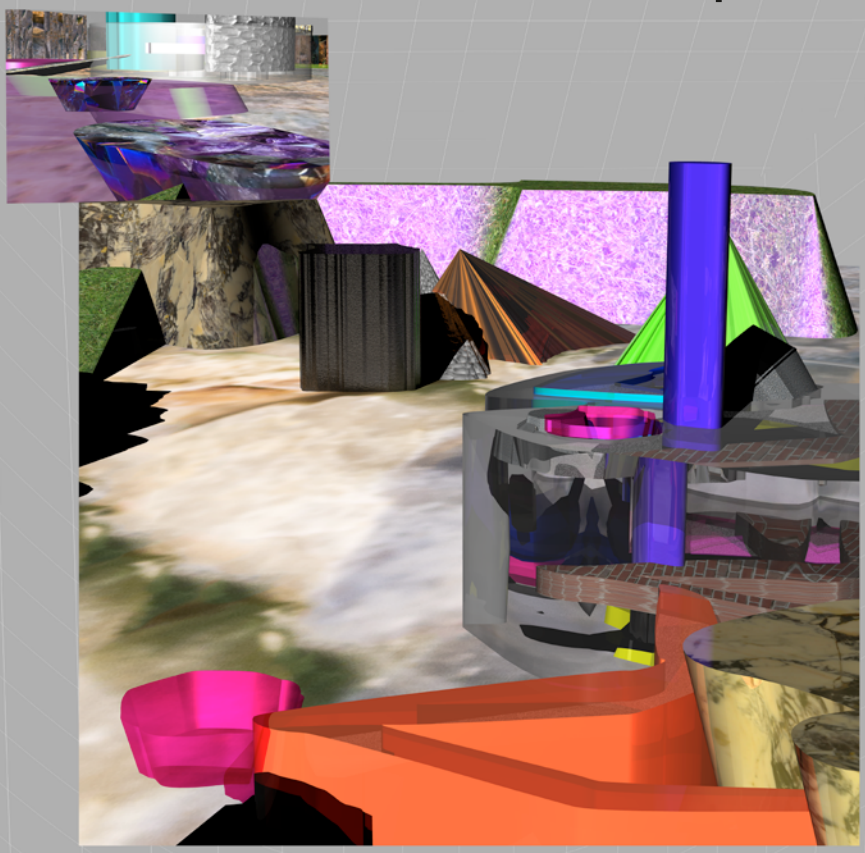
#methods Format	#postnature Theme	#collapse Action

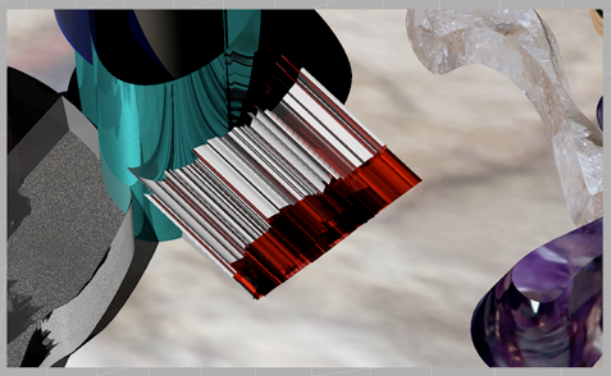
A series of virtual environments situated within an Anthropocenic narrative of environmental destruction in the name of digital preservation and virtual resolution

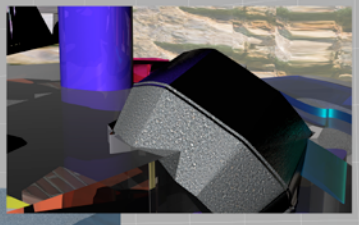
FUTURE RELIQUARIES: OUTPOSTS

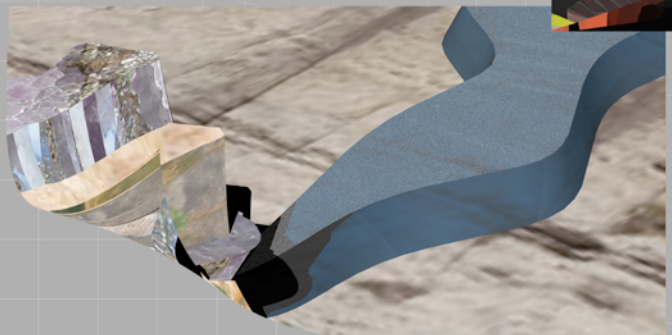
Future Reliquaries: Outposts is a series of virtual environments situated within an Anthropocenic narrative of environmental destruction in the name of digital preservation and virtual resolution. The larger project Future Reliquaries is a series of acrylic sculptures, prints, drawings, and 3D models. The project engages the aesthetics of archeology, artificiality, nature/culture, contradictions of the sustainability movement and survivalist environmentalism, speculative design Posthumanism, and the Anthropocene.

Future Reliquaries: Outposts is a speculation on future archeology wrapped in the metaphors of plastic as a material that serves for preservation but effects a parallel destruction. The project is inspired by and will continue to grow in dialog with the 3D Additivist Manifesto.









Future Reliquaries: Outposts
Project

#methods
Format

#postnature
Theme

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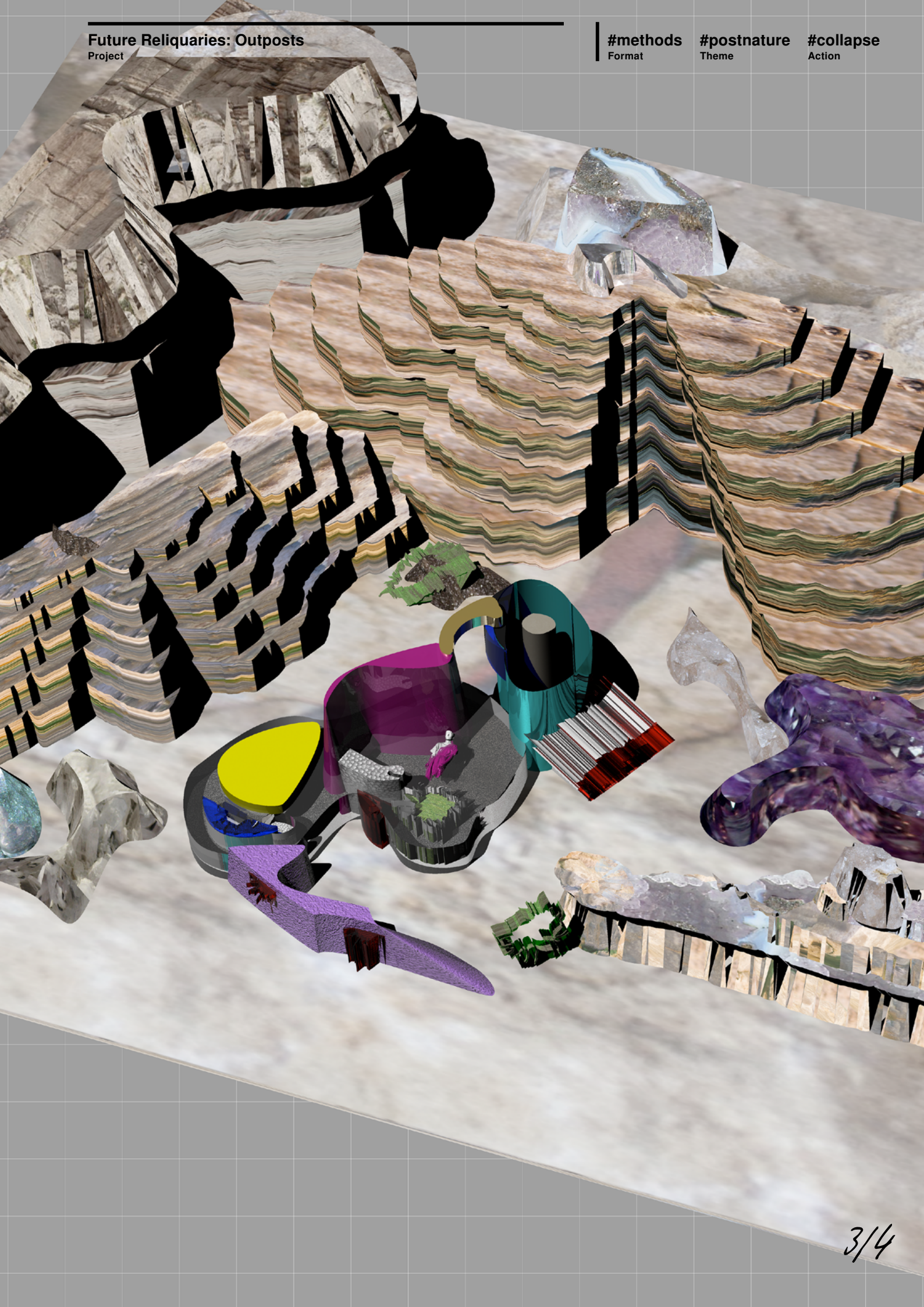
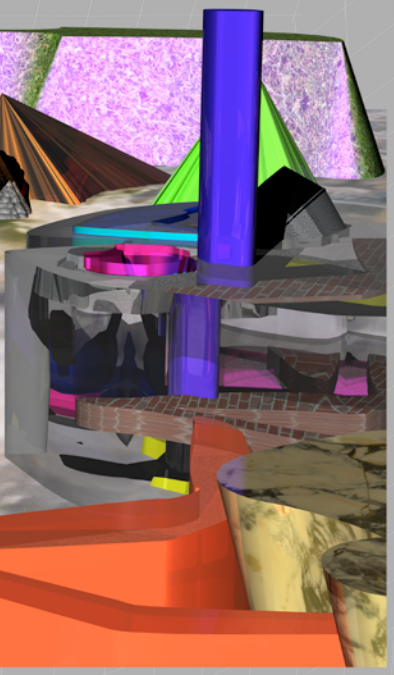
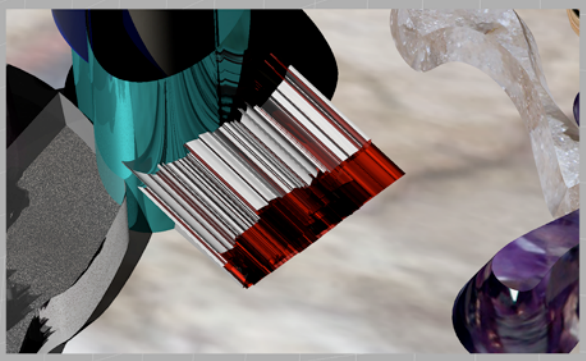
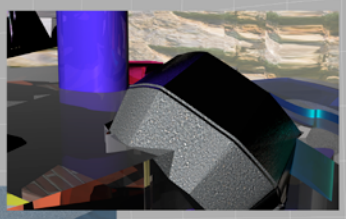
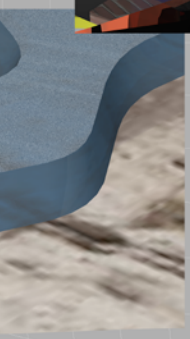
Action











North View
One day the things formerly known as Nature descended upon them. They were told that their world was ending but for the most part the humans didn't want to talk about it. Apocalypse was for popular cinema and the streets of third world countries they could ignore. Their world was just beginning, they said. See it here on the screen, increasing resolution beyond the capacity of the human eye.

East View
They banished the things to the edges of their communities, to wait and watch the destruction unfold. It's all about survival, they said. If bees were meant to keep being, they would learn to feed on the radiation from cell phone towers. Coast dwellers would learn to metabolize plastic. The goal was to survive in the most destructive way possible. To live longer by killing oneself slowly.

South View
They decided to devote all of their energy towards reproducing the world as a digital image. They built it out in three dimensions, wrapped it in textures, taught it to replicate itself. Meanwhile, on the outskirts the debris accumulated: melted, extruded, solidified, exchanged colors and properties through chemical reactions.

West View
One by one strange conglomerates floated in from the gyre, were exhumed from the rubble of construction sites, or discovered as if dropped from the clouds onto barren fields. Their contents were difficult for most to decipher, their textures less resolute than those in the virtual world. Somehow, they always appeared flat upon first encounter, until the viewer's eyes adjusted.

Nora Al-Badri and Jan Nikolai Nelles
Author

NefertitiHack
Project

2016
Year

#methods
Format

#resistance
Theme

#break
Action

An artistic intervention questioning the singularity, originality, and ownership of material objects of other cultures

NEFERTITIHACK

‘With the data leak as a part of this counter narrative we want to activate the artifact, to inspire a critical re-assessment of today’s conditions and to overcome the colonial notion of possession in Germany.’

‘The Other Nefertiti’ also known as #NefertitiHack is an artistic intervention questioning singularity and originality as well as ownership of material objects of other cultures. The artists went into the Neues Museum, Berlin, and secretly scanned the bust to release the data at the 32C3 under public domain. The data leak was a part of a counter narrative to inspire a critical re-assessment of today’s conditions and to overcome the colonial notion of possession in Germany’s museums. The head of Nefertiti represents all the other millions of stolen and looted artifacts from all over the world; acts currently taking place, for example, in Syria, Iraq and in Egypt. Archaeological artifacts as a cultural memory originate for the most part from the Global South, however, a vast number of important objects can be found in Western museums and private collections. One should face the fact that the colonial structures continue to exist today and still produce their inherent symbolic struggles.

The Nefertiti 3D model data is provided here under a public domain license.

Freiheit für Nofretete!

NefertitiHack
Project

#methods
Format

#resistance
Theme

#break
Action

ARTISTS LIKELY FAKED SURREPTITIOUS SCAN OF NEFERTITI BUST

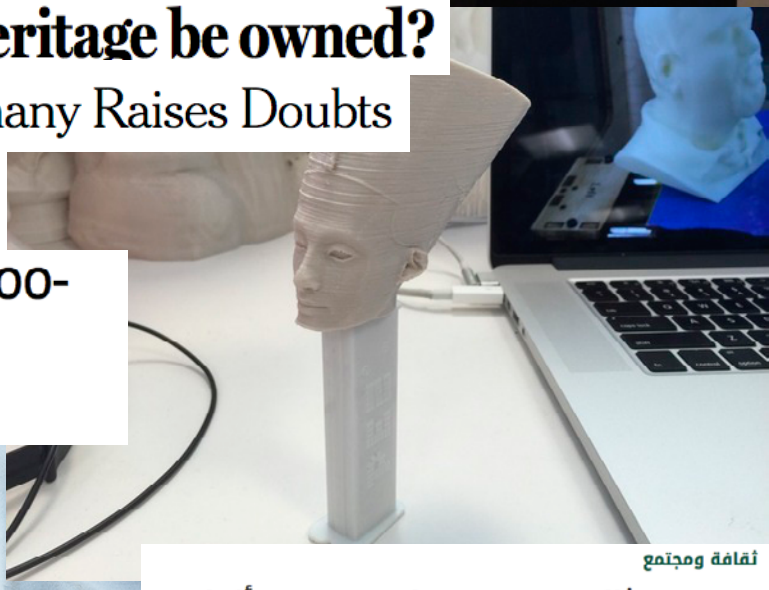
BUSTED, AGAIN

Thanks to Sneaky Scanners, Anyone Can 3D Print a Copy of Nefertiti's Bust

Scans of the famous sculpture are free for the taking

Can technoheritage be owned?

Nefertiti 3-D Scanning Project in Germany Raises Doubts



Artists' Sneaky Nefertiti Bust Scan May Have Been Faked

The impossibility of stealing a 3,000-year-old head with a video game controller

That Secret 3D Scan of Nefertiti's Bust Was a Hoax

2ศิลปินดัง แจกแบบ3มิติ รูปปั้น "เนเฟอร์ติติ" ราชินีแห่งอียิปต์

ثقافة ومجتمع

تصوير تمثال نفرتيتي سرا في متحف ألماني وتقدم الصور ثلاثية الأبعاد مجانا لمن يرغب

3Dプリンティング , アート

ネフェルティティの胸像、美術館が知らないうちに3Dスキャンされデータが公開される

REPORTAGE

Le projet de deux artistes pour rendre le buste de Nefertiti aux Egyptiens

ART WORLD

Artists Return Nefertiti Bust to Egypt Thanks to Covert 3-D Scanning

Nefertiti for everyone: returning Egypt's cultural history with the help of a 3D printer

Where do cultural artefacts belong? And what do we really mean by "original"?

Could the Nefertiti Scan Be a Hoax — and Does that Matter?

3D Scanned Nefertiti: Real, Fake, or Real Fake?

Artists Covertly Scanned Bust of Nefertiti With Xbox 360 Kinect to Protest Museum's Artifact Looting

Steve Cox @SteveCox3D · 29. Feb.
Last week's "hot" #3dprint.....

Behnaz Farahi
Author

Synapse
Project

2015
Year

#device
Format

#sense
Theme

#bridge
Action

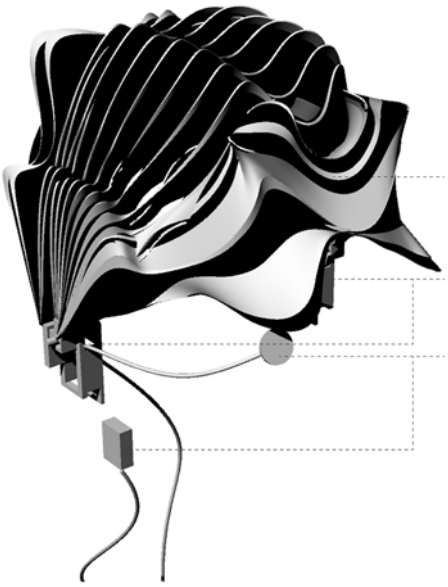
A neuromorphic 3D printed body architecture

SYNAPSE

1/2

Synapse is a multi-material 3D printed wearable piece, which aims to play with the intimacy of our bodies and the environment to the point that the distinction between them becomes blurred, as both have 'become' a single entity.

The motion of the helmet is controlled by the Eletroencephalography (EEG) of the brain. A Neurosky's EEG chip and Mindflex headset have been modified and redesigned in order to create a seamless blend between technology and design. Neurosky's EEG technology has the ability to assess cognitive load and measure various data such as Attention, Meditation, Delta, Theta, Low Alpha, High Alpha, Low Beta, High Beta, Low Gamma, and High Gamma values. EEG technology allows the recording and monitoring of the electrical activity of the brain, produced from the firing of neurons. The neural commands related to the 'attention' level are therefore translated into actual motions. This operates as a direct interface that allows users to interact with their immediate and non-immediate environments. The 3D printed helmet was produced using Autodesk's Object Connex500 multi-material 3D printing technology, which is able to print a soft (black) and hard



2/2

(white, in this case) in a single operation. The design of the helmet aims to provide a flexible/soft structure which enables maximum contraction and expansion. Synapse demonstrates the possibility of 'wearable architectures' by engaging with the very latest and most advanced 3D printing technologies. The project explores the tectonic properties of these new 3D printing technologies in relation to the human body. It also engages with a series of interdisciplinary challenges, ranging from a technological grasp of how such environments might be able to change morphologically to a psychological and neurological grasp of how human beings might themselves respond to those changes, and become active agents in remodeling and redesigning those environments.

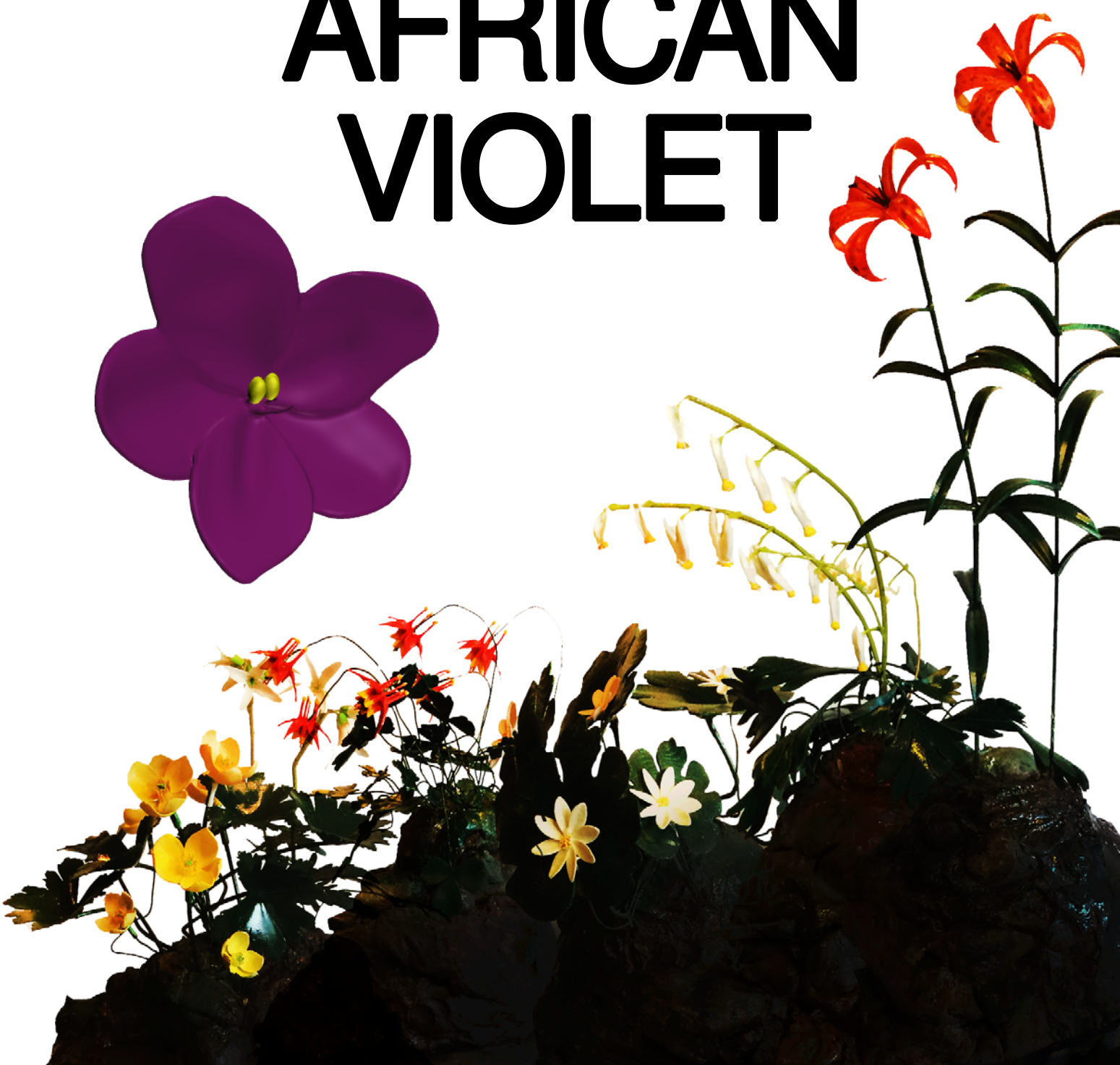
Darlene Farris-LaBar	Purple Flowered African Violet	2016
Author	Project	Year

#device	#postnature	#extract
Format	Theme	Action

Synthetic house plant providing ironic, postnatural refuge from the onslaught of climate change

PURPLE FLOWERED AFRICAN VIOLET

1/2



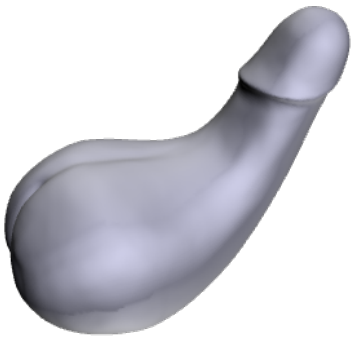
After 5 million years of genetic differentiation, the wild growing Purple Flowered African Violet may come to an end because of climate change. Taken from its original habitat located Eastern Arc Mountains of Kenya and Tanzania over a century ago, this plant is now better known to many as a conventional house plant. As this vulnerable plant loses its pristine rocky and moist habitat because of the changing climate, future discoveries of its amazing genetic adaptation will be lost forever leaving us with an impoverished gene pool. The Purple Flowered African Violet is just an example of what can happen to many other indigenous plants dependent on a limited natural places that are being greatly impacted from actions caused by humans.

Eastern
Arc Mountains
of Kenya and
Tanzania

#fabulation Format **#play** Theme **#extrude** Action

3D scans of the objects assembled in Mark Leckey's exhibition *The Universal Addressability of Dumb Things*

THE UNIVERSAL ADDRESSABILITY OF DUMB THINGS



1/3

I was asked back in 2013 by the Hayward Touring programme to curate a show that would tour around the UK. So I started to collect things on my desktop. Google gave me access to most everything I wanted and led me to things I didn't know I wanted. I built the exhibition on my desktop: with Photoshop and Final Cut and Logic the whole thing was there, and it was mine. I was attached to every virtual object; I'd fallen in love with them.

Then came the real world show, and although it was lovely to see all these artifacts in the flesh, so to speak, I couldn't get close to them. They were too precious, too aloof, too sovereign somehow. They weren't 'my' objects anymore. So I decided to 3D scan them, then I could get them printed and make them mine. I could wholly possess them. They would become my own custom-made repertoire. I don't know what any of this means, I was just following my impulses. It seemed like something that was only available to do right now, that technology was making something new: like the amplifier was to rock and roll, and that I should just follow my instincts and let it lead me wherever it was going to take me.

‘I think of this show as a work of fiction: a non-realist, anti-realist, magic-realist, speculative, slipstream fiction, a sort of sci-fi show. An inflation or amplification of the way the world appears to me now, a shape of ‘things’ to come. As it seems to me, the further technology evolves the more our minds devolve back to the imaginings of our asuperstitious past. Call it an animistic future or techno-atavism. *The Universal Addressability of Dumb Things* is a world beyond tomorrow when every ordinary, unthinking object – tinned meat, refrigerators, paving stones – becomes an active participant in the Great Connection. Now I already find objects bewitching as they endow blessings and inflict punishments on me every day. And technology seems only to be increasing their supernatural potency as I sit in front of my machine and with a touch my wishes are made manifest. The mental gets materialized.’
– Mark Leckey

2/3

‘So let’s say that all the objects in the show have already communicated with each other and they’ve called themselves together. They’ve formed a Parliament with representatives from the Vegetable World, Animal Kingdom, Mankind and the Technological Domain. And the breadth of that assembly is contained within its two hands: a Medieval reliquary and a bionic limb. Everything from one hand to the other is equal in aspect, with no distinctions drawn between, whether it is organic or inorganic, from the past or the present, whether it’s imagined or real. The full figure of Sputnik continually girdles the earth as the Giant of Cerne Abbas stares forever up to the stars and the stars keep staring back.’ – Mark Leckey

3/3

VAMPYROTEUTHIAN ART

“THIS STRUGGLE FASCINATES VAMPYROTEUTHIS; IT ABSORBS HIS INTEREST. THIS ‘FEEDBACK’ BETWEEN EMITTER AND RECEIVER, THIS DIALOGUE, IS THE ESSENCE OF VAMPYROTEUTHIAN ART.”

1 Vilém Flusser, Vampyroteuthis Infernalis, trans. Rodrigo Maltez Novaes (New York: Atropos Press, 2011)

Both men and Vampyroteuthes are engaged against oblivion, such fundamental tendency in nature. Both store and transmit acquired information. Both are historical beings. Although both are engaged in memory, we are not so in relation to the same type of memory. We do not even use the same methods to store data, and this is the decisive difference.

Men seek to imprint acquired information onto objects. Other men that pass by the informed objects will collect the information thus 'objectified'. We trust the relative presence of the objective world, and that is why we entrust it with our acquired information. We trust that informed objects might outlive us, and after our deaths attest to our passage through the world. Therefore, humanity hopes to possess two types of information storage: one for genetic information, the egg, and one for acquired information, objective culture (books, buildings, paintings etc.). Thanks to these two types of storage, humanity considers itself immortal: through the egg as a species, and through informed objects as individuals.

Such human trust in the permanence of the objective world seems quite derisory from the point of view of those who, like Vampyroteuthis, inhabit a liquid environment. From this point of view, the only material for information storage that is worthy of trust is the egg. Genetic information is *aere perennius*[2] and will not only outlive all books, buildings, and paintings, but also the species itself, although in a mutated form. Long after all of the human creative oeuvre has been reduced to dust, human genetic information shall continue to be transmitted from generation to generation, although possibly by a species evolved from humans. So much so, that the problem of historical engagement is to elaborate methods that allow for acquired data to be stored in the same memory that also stores inherited data. Thus placing trust in the permanence of the species and its future development, and not in the permanence of the objective world. Certainly: such storage and transmission methods may resort to objects. However, such objects shall not be storage material, but transmission channels: 'media'.

It may seem at first glance that the difference of choice between types of memories and methods is not that decisive. That it is merely a difference in emphasis. Men also consider objects as media, and when they manipulate objects they also seek to transform them from barriers into communication channels that transmit information to other men. Vampyroteuthis also resorts to several types of objects (colours, lights, sepia clouds etc.), which he manipulates in order to transmit information to other Vampyroteuthes. The difference is only that men trust the permanence of objects more so than Vampyroteuthes. This minimisation of the difference, however, would be misleading. Because man is a being that seeks his immortality in objects, and that is why he expresses himself through them. Vampyroteuthis is a being that seeks his immortality in the Other and that is why he expresses himself in others through objects. These are two different gestures of articulation, two different manifestations of the spirit, two types of publication, two different public attitudes, two different ways of externalising intimacies, of publishing the private, of exhibiting the inhibited; two opposing attitudes in relation to the ineffable. In sum: it effectively comes down to two different types of art.

When man seeks to express a particular experience, when he seeks to make audible the inaudible and visible the invisible, he does so in function of a particular object. Within human articulation, experience and object are inseparable from each other. Everything that man experiences is experienced 'for' a particular object: for marble, for a particular spoken or written language, for musical sounds, for celluloid film. And every object that man encounters on his way towards death implicitly contains the categories that allow the articulation of particular experiences: a particular sentiment, thought, value, or desire. It is not the case that man has experiences first and then seeks an appropriate object through which to express them. Hence, man experiences the world in function of a particular object: as marble sculptor, as orator or writer of Portuguese, as musician, or as film producer. The objects, be they 'material' or 'immaterial', be they stones and bones, or numbers and letters, shape all human experience.

Every object is perfidious: it resists the human attempt to inform it, and every object is perfidious in its own way. Stone breaks when hammered, bone cracks when chiselled, numbers impose their own rules upon thought expressed through them, and linear writing transforms the sentiment expressed through it. To inform objects is to struggle against the specific perfidy of every object. This struggle slowly reveals the resistance of objects: the structure of cotton that sags, of glass that cracks, of concrete that dries out, of the tonal scale that becomes tempered, or of the language syntax that inflects. Therefore this discovery of the structure implicit in every object is in itself also an experience that men acquire. This is such a violent experience, that not only does it provoke appropriate

2 More lasting than bronze or brass.

knowledge and techniques for specific objects, but also modifies man himself. It is therefore important to store and transmit these acquired experiences, and to do so via methods of expression proper to the object. Thus, there emerges 'feedback' between man and object, through which man informs the object and has experiences; experiences that will be used again to inform other objects. Such 'feedback' is the essence of human art.

The object's resistance provokes man. As if it was a voice that came from the object, calling to be informed. This is the human vocation. There are men whose vocation is to inform stones, and others whose vocation is to inform letters. Whoever does not discover the object of his vocation will live in frustration. The vocation, this 'feedback' between man and object, is so passionately engaging that it leads man to forget his original purpose, that of informing objects so that the information can continue to be available to other men. The object itself absorbs man's interest. In the same way that stone transforms into statue and writing into text, man is transformed into sculptor and writer, and forgets that he is a man for other men. Man, with all his feelings, thoughts, values, and desires, realizes himself in stone and in letters. All of his passions and actions become concentrated onto the object. An example of this objectification of existential interest is poetry. Language is apparently a medium for intersubjective communication, and yet the poet realizes himself during the struggle against the deeply rooted rules and structures of language. No longer does he speak through language, but against it. He objectifies its intersubjectivity. The poet's vocation is to inform language.

Therefore, human art is not as the well-meaning bourgeoisie would have us believe: the fabrication of 'beautiful' objects. Human art is the gesture through which man imprints his experience onto the object of his vocation in order to realize himself in the object, to immortalize himself in it. Every object thus informed is a 'work of art', be it a mathematical equation, political institution, or symphony. Certainly: the mathematical equation transmits above all epistemological information, the political institution ethical information, and the symphony aesthetic information. However, the labeling of 'works' as scientific, political, and artistic, is misleading. This is so because every human experience to be expressed in objects implies all three informative parameters. Every experience implies knowledge, value, and sensation, and it does so simultaneously. To divide informed objects, or 'culture', according to these three labels is to ignore that man is a being that, by vocation, expresses acquired experiences onto objects. One who, by vocation, 'works'. And that every human work is 'art': an answer to a provocation emitted by a particular object.

Objects do not provoke Vampyroteuthis. Objects do not divert his existential interest: he aims always towards the Other. His creative activity, through which he stores acquired experiences, goes beyond objects, and is directed towards the Other. The sepia cloud does not impede his tentacles, as stone impedes human fingers. His chromatophores are not curtailed by the rules of skin colouration, as is human speech by linguistic rules. Tentacles and chromatophores go beyond the object. They do not 'make', they 'complete'. His creation is not 'made', but 'perfected'. That is why when he creates, Vampyroteuthis does not experience the perfidy of the object but the perfidy of the Other. When he articulates the ineffable, he does not struggle against the perfidy of matter, but against the perfidy of the message's receiver. He does not want to violate objects by imposing new information onto them; in order to be informed, it is the Other that has to be violated. The Other's memory is for Vampyroteuthis the same as stone and language are for us. Vampyroteuthis is sculptor and writer working against the Other. He hammers and composes the other. Vampyroteuthis' vocation is the Other. It is during the violation of the Other that Vampyroteuthis realises himself. It is through this struggle against the Other that Vampyroteuthis acquires new experiences. This struggle fascinates Vampyroteuthis; it absorbs his interest. This 'feedback' between emitter and receiver, this dialogue, is the essence of vampyroteuthian art.

Within this artistic creation we are able to distinguish between several phases: (1) Vampyroteuthis goes through a particular experience; (2) he searches in his memory for a suitable model in order to capture it; (3) he verifies the absence of such a model: the experience is as yet unuttered; (4) this arresting experience goes beyond his organism, is organized by the brain, and is then transmitted to the chromatophores; (5) the chromatophores transcode the experience into a 'skin painting' code; (6) such skin coloration, never seen before, provokes the curiosity of another Vampyroteuthis; (7) finally, the emitter uses the new coloration to seduce the receiver and copulate with it. The result of this creative process is that henceforth there is a model to capture the unuttered experience, and that this model is thereafter stored in the memory of the copulating mate. The acquired information was thus incorporated into the vampyroteuthian dialogue and will remain there forever. This is because vampyroteuthian dialogue is eternal, as eternal as the genetic information stored in the egg.

A comparable creative process occurs when Vampyroteuthis does not make use of the chromatophores, but uses the sepia cloud to transmit acquired information. It would be misleading to think that a 'feedback' between tentacles and sepia cloud is established in such a process, like the 'feedback' between marble and human fingers. This is not because the cloud is plastic and ephemeral, and marble permanent and hard. Instead, this is because the cloud is a vampyroteuthian secretion and marble is an object that is strange to man. The cloud does not fascinate Vampyroteuthis like marble fascinates man, because the cloud is not strange to him. As he models the cloud Vampyroteuthis is fascinated, just like man as he models marble. However, Vampyroteuthis is fascinated by the effect that the modelled cloud will have upon another Vampyroteuthis. His fascination is not objective but intersubjective.

Here is what happens during the modeling of the cloud: Vampyroteuthis goes through a particular experience, an adventure. His genetic information programmes him to secrete sepia in such dangerous situations. The same genetic information programmes him to model the cloud in such a fashion that the danger is directed against the cloud and not against him. Vampyroteuthis is genetically programmed to divert the enemy's intention. However, Vampyroteuthis reflects: as opposed to other, less evolved octopi, he controls and re-programmes his own genetic programme in function of deliberate decisions. The experience that Vampyroteuthis has just gone through must be expressed in the cloud, no longer with the intention to divert a hypothetical aggressor, but to store this experience in the memory of another Vampyroteuthis. The cloud should not astound a hypothetical aggressor but should astound another Vampyroteuthis with the intention of forcing him to store the experience. The cloud must *épater les bourgeois*[3] so that they remember what happened. The purpose of modeling the cloud is to divert the attention of the other Vampyroteuthis away from his intention, and to direct it towards the new information. So that other Vampyroteuthes are drawn towards the cloud and devour it thinking that they are devouring the emitter of the message. Thus, the new information is incorporated into the vampyroteuthian dialogue forever by the method of deliberate deception, artifice, and lies: 'Art'.

The vampyroteuthian creative process is the method through which new models of sensation, knowledge, and value, are articulated and then transmitted to others, who are violated by seduction, or lies, in order to store the models. Vampyroteuthian art is a series of artifices, thanks to which, the vampyroteuthian society is violated in order to accept particular models, transmitted through the intermediation of ephemeral and despicable objects. That is why there is no 'pure art', 'pure science', or 'pure politics' for Vampyroteuthis. Vampyroteuthis is, in every sense, a 'complete artist', that is, a being that seeks to attain immortality through the epistemological, aesthetic, and ethical modeling of the Other. He seeks his immortality by means of violence exerted upon the Other. To him, science and politics are nothing but stratagems of art, nothing but traps. The aim is to inform the Other, to alter him, to impose on him particular information, knowledge, behaviour, and sensations, which have been deliberated by the emitter of the message. Vampyroteuthian art is total and totalitarian, because the raw materials are not objects, but rather, society. Vampyroteuthis is an artist that hammers society in order to immortalise himself. The motive for vampyroteuthian creativity, for his search for immortality, is his spite for the Other. That is why, to him, 'art' and 'deceit' are synonyms.

Certainly: the vampyroteuthian creative process differs radically from the human one; it is a different gesture, and has a different purpose. However, its consideration provokes two opposing reactions.
On one hand, our own art shall reveal, in its anti-vampyroteuthian aspects, a less than flattering character. But on the other hand, we shall discover, in our own art, a clear tendency towards approximating vampyroteuthian art. We may summarise this reaction with the following: inasmuch as human art diverges from vampyroteuthian art, it is a confused and undisciplined enterprise, and as human art acquires self-awareness and discipline, it moves towards a convergence with vampyroteuthian art.

Men, as opposed to Vampyroteuthes, have 'purity': pure art, pure science, pure social technique etc. However, from Vampyroteuthis' point of view, human purity reveals itself to be rubbish: the human artist is only pure when his existential interest stagnates on the path towards the Other, in the swamp of some dirty object (stone, sound, linguistic syntax etc.); the human scientist is only pure when his interest stagnates in the swamp of some other dirty object (phenomenon, equation, theory etc.); the social technician is only pure when his existential interest manages to transform the Other, towards whom he drives, into an object (economy, sociology, politics etc.), which is the dirtiest of all objects. Therefore, 'purity' is a consequence of distracted interest; a perversion of interest. The human artistic gesture reveals itself as

3 To shock the bourgeois.

an embarrassing gesture, as when a chicken pecks for grain, when it doesn't know whether it should flee or attack the enemy. Human art is pure because it has forgotten its purpose, which is to transmit information to others so that they may store such information.

However, men have started to become conscious of their forgetfulness. They have started to become aware that art history is a history of misunderstandings. They have started to do 'communication theory'; to make the artistic gesture more conscious and disciplined. The consequence of this is the communications revolution that is now underway, which will restructure all human activity. Deep down, this revolution is a diversion of the human existential interest stagnated in objects back towards the Other. Our communicational structures are being fundamentally transformed, in the sense of becoming constituted by ephemeral and transient media that allow the Other to be informed without the need for objects. It is as if humanity has finally, after a multi-millennial wander through the objective world, re-encountered the vampyroteuthian path. This vampyroteuthisation of human art deserves a closer look.

Before the industrial revolution every creative man was a craftsman, be it a blacksmith, cobbler, painter, or poet. The post-industrial distinction between craftsman and artist was nonsensical: all of these creators imprinted information onto objects, whether it was iron, leather, canvas, or letters. The object stored the information expressed within it; it was a 'work of art', and the information stored was the 'value' of the work. In this way, the three concepts: information, value, and artwork, were inseparable. Together, they constituted 'culture'. The industrial revolution destroyed this concept of 'culture'. It invented a method of production that allowed information to be imprinted onto tools that imprinted information onto objects. No longer blacksmith or cobbler, but now tools informed iron and leather, and the creative man became the toolmaker. The tool stored the information and it was, therefore, the tool that had value – the object simply transmitted the information stored in the tool. The object was no longer a work of art, and its value become lower and lower. Object and value started to separate and the concept 'work of art', and therefore of work, became diluted. The most clarifying example of this rupture in the concept of 'culture' is provided by the printing press, a precursor to the industrial revolution as a whole. The information was stored in the printing press and not in the printed book. The value was in the manuscript and not in the book itself, which acquired a pitiful value. The writer became a toolmaker. Society did not realise, at the time, the impact of the industrial revolution upon the creative process, because art, in the restricted modern sense of the term, continued to be crafted, untouched by the new methods of production, since it was relegated to ghettos called 'exhibitions and museums'.

The second industrial revolution that is currently beginning constitutes a new reformulation of production methods: information is no longer stored in tools but in cybernetic programmes within apparatus that produce tools. Thus, it is the programmer (the analyst and systems' developer) and not the toolmaker that informs. The apparatus will automatically imprint information onto tools, which will in turn, automatically imprint the information onto countless objects. Hence, a tsunami of cheaper and cheaper gadgets that are pitiful for being banal emerges; ephemeral stereotypes, carriers of diluted information: 'mass culture'. This is the culture of plastic pens, of pre-fabricated houses, and of stereotyped political opinions. Programmed culture. A valueless culture, because apparatus produce it automatically. Value and information are thus stored in the artificial memory of the apparatus. Therefore, this inflationary tide of devalued objects leads to a disinterest in objects. Such objects no longer fascinate. It is no longer interesting to possess these objects. They become objects of mere consumption. That is: they are used until the information imprinted onto them is worn out, at which point, they are thrown into the dustbin. Society's interest is increasingly diverted from objects towards information, which, however, remains inaccessible to consumers. Such information is stored in the memory of apparatus and transmitted, diluted, not only by the gadgets, but also, and above all, by the ephemeral channels of mass communication. In this way, the society of the immediate future shall be a society of information consumption, increasingly less interested in the consumption of 'goods', of objects. Its interest will be diverted from economy to sociology. An intersubjective society: a society of Vampyroteuthes.

Man was, until recently, a being who worked. To work is to imprint information onto objects, 'to transform the objective world'. From now on this will be the work of apparatus. Men will no longer be workers and shall become message programmers and receivers. The 'production moral' will disappear simultaneously with the 'private property moral'. A new moral shall emerge, one of elaboration and consumption of messages. Human existence will no longer realise itself in the struggle against objects, but in the struggle for the preservation and transmission of acquired information. Men shall cease to be 'workers' and will become 'systems' functionaries'. Total artists functioning within programmed totalitarianism: Vampyroteuthes.

The most clarifying example of this new rupture in the concept of 'culture' is provided by photography, an invention that is the precursor of the second industrial revolution now underway. The individual photograph is a pitiful object of almost no value, an ephemeral stereotype easily replaceable. The value is in the information imprinted onto the photograph, which is stored in the prototype, the 'negative'. The photographic apparatus produces these prototypes automatically according to a specific programme contained within the apparatus. The photographer does not work, but rather functions within the apparatus' programme and re-programmes the apparatus. The purpose of the photographer is not to produce photographs, but to transmit information through photographs. What fascinates the photographer is not the photographic paper, the object, but the information to be transmitted. The photographic paper is for the photographer what the skin is for Vampyroteuthis: a medium for colorful messages.

Will then the vision of vampyroteuthian art necessarily be the vision of our own immediate future? Will the human society of the future necessarily be a society of hatred, lies, and the violation of the Other through seduction and deception? There are reasons to state that such a future is probable but not inevitable. The difference between vampyroteuthian art and the human art of the future is this: although we may come to despise the objective world as much as Vampyroteuthis despises it, although this world may become to us a mere collection of ephemeral communication channels just as it is for him, we emerge, as opposed to him, from a struggle against objects that has taken tens of thousands of years. This struggle, and the experiences acquired through it, are stored in our memory but not in his. We have engaged in this struggle against objects in cooperation with all other men, and have been able to emerge victorious only due to this cooperation. We still have stored in our memories the fact that initially, in the Palaeolithic Age, all men were constantly threatened by the objective world and were therefore obliged to unite against this world. In such a way, that for us humans, the Other is not merely an adversary to be violated and informed, but also an ally who creates information together with us. In fact, this memory of the primordial alliance slowly falls into oblivion under the impact of mass culture. However, this memory is still present within us, and can help prevent us from transforming ourselves into heirs and transmitters of programmed information.

We are able to observe how, for Vampyroteuthis, information programming can dismiss the need for apparatus. The organism may function as an apparatus. Apparatus functionalism may become 'integrated'. The apparatus-like behaviour may 'overcome the apparatus'. Thus, there could emerge a totalitarianism of integrated apparatus, which are therefore invisible and imperceptible. Just like the gelatinous mass of Vampyroteuthis. The contemplation of vampyroteuthian art prevents us, therefore, from glorifying the total work of art, artificiality, artifice, and deception, so that we shall avoid every form of Romanticism, because Vampyroteuthis illustrates the essence of Romanticism: Hell.

Jason Ferguson
Author

MeshBombing
Project

2015
Year

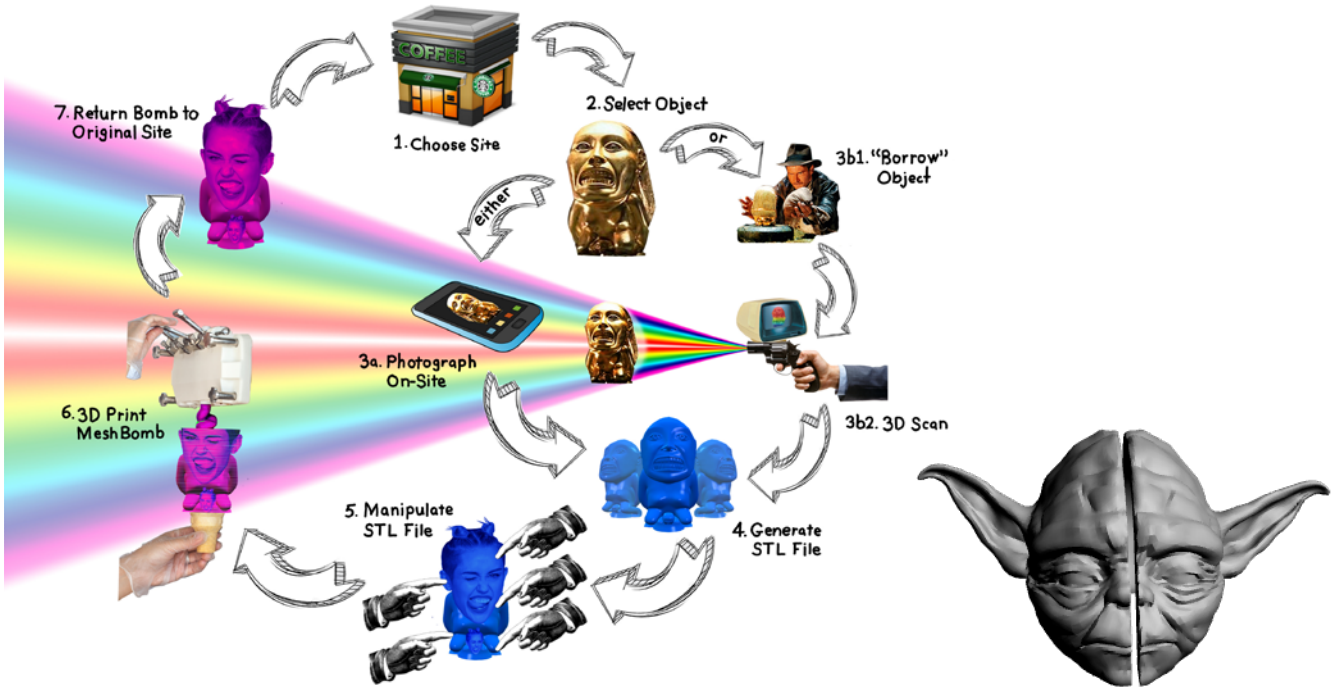
#recipe
Format

#play
Theme

#deface
Action

Subtle public interventions in which an object is 'borrowed' from a location, replicated digitally, altered, and discretely returned to the original site

MESHBOMBING



'That factor which consists in a recurrence of the same situations, things and events, will perhaps not appeal to everyone as a source of uncanny feeling. From what I have observed, this phenomenon does undoubtedly, subject to certain conditions and combined with certain circumstances awaken an uncanny feeling, which recalls that sense of helplessness sometimes experienced in dreams.' (Sigmund Freud, The Uncanny 1919)

The ability to accurately replicate and appropriate dimensional objects, with or without permission, is a unique addition to the current state of Mashup Culture. The potential to steal a dimensional form and manipulate the object however you choose, while leaving the original completely unscathed, is a relatively new process available to anyone with a camera and access to a computer. Gently manipulated replicas of objects that already exist in a space can have a powerful psychological impact on the mundane cycle of habitual living. With this thought in mind I have developed a process for unsolicited public artworks called *MeshBombing*.

MeshBombs are subtle interventions in which objects are 'borrowed' from a public location, digitally replicated and altered, then quickly returned to their original site within a new sculptural composition. Subtlety is key for this type of work to have an impact. Files that have been manipulated drastically will lose all connection to the original object; however, with slight alterations (e.g. change of color, shift in scale, repetition, mirroring, etc.) the public interventions have the potential to '…awaken an uncanny feeling, which recalls that sense of helplessness sometimes experienced in dreams' that Freud speaks of. This text exists as a Call-to-Action and a push to create MeshBombs throughout your city.

HOW-TO MESHBOMB:

1. Choose Site: Target an establishment with frequent repeat customers. Subtle changes and the slight movement of objects are most effective when your installation disrupts a consumer's normal routine.

2. Select Object: Identify an item that carries social, political, or purely aesthetic potential.

3. Digitally Capture Object: Be sure to collect enough images and/or scans to render an accurate digital replica in your chosen 3D software. This can be done in one of two ways:

a. Photograph On-site: Although this is the legal and easier approach to gathering data, photographing the object on-site makes it difficult to stay anonymous. If you choose to photograph the object in its original location do so quickly and discretely. Photograph the object from all sides and angles to be sure that you have enough data to work with later.

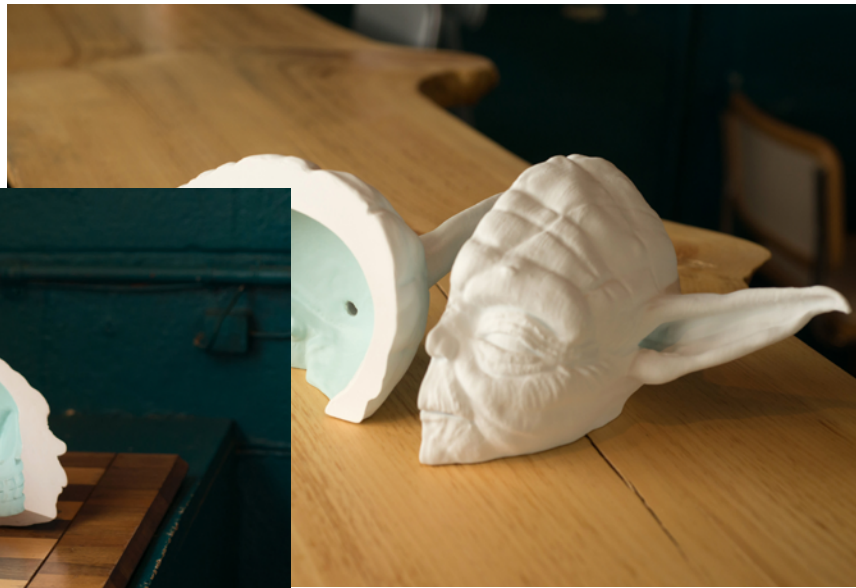
b. 'Borrow' the Object: I'm not suggesting that you commit petty theft, however, every person that knows what you are doing adds risk. The instant that people are aware of your goal and can identify who you are the project is dead.

4. Generate STL File: Use the photographs or 3D scans that you've gathered to generate a 3D model using CAD software of your choosing. This model should be a solid replica of the original object with accurate dimensions and detail.

5. Manipulate STL File: Bring the original 3D model into a file manipulation program. There are many free open-source and proprietary programs available to help you hack, slash, distort, and mix your object(s) to aid in the creation of your work of art.

6. 3D Print Your MeshBomb: Use additive manufacturing techniques to make your three-dimensional graffiti. Print your MeshBomb yourself or use one of the many 3D printing services available to make your creation tangible.

7. Return Bomb to Original Site: Take your MeshBomb, and the original object if it's in your possession, to the location where you began. Wait for the right moment and discretely setup your installation. Walk away.



Leo Selvaggio Author	URME Recipes: Cooking with Privilege Project	2016 Year

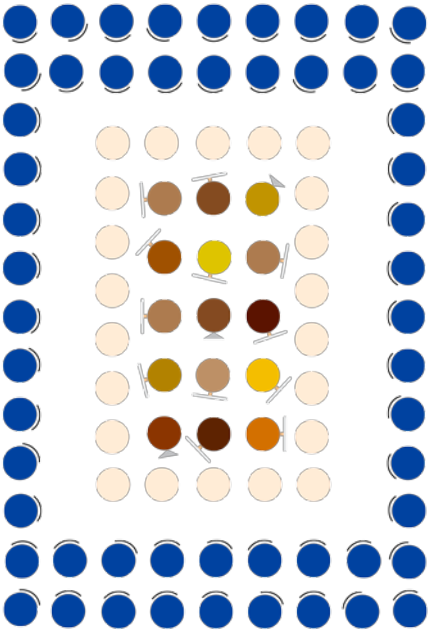
#recipe Format	#figures Theme	#collapse Action

Toolkit for translating the artist's identity into a malleable material, to be waved in the face of overwhelming technological power

URME RECIPES: COOKING WITH PRIVILEGE

THIS LEAFLET WILL INTRODUCE YOU TO YOUR FAVORITE NEW PRODUCT, LEO-NAISE, FROM URME KITCHEN INCORPORATED. URME IS DEDICATED TO PROVIDING YOUR KITCHEN WITH THE LATEST IN IDENTITY TECHNOLOGY. LEO-NAISE IS A DYNAMICALLY DISRUPTIVE PRODUCT THAT USES LOCALLY-SOURCED ARTIST LEO SELVAGGIO AS A BASE. CREAMY WHITE AND FULL OF PRIVILEGE, LEO-NAISE IS BOUND TO CHANGE HOW YOU THINK ABOUT CIVICALLY AND SOCIALLY ENGAGED COOKING! BELOW ARE JUST A FEW DELICIOUS URME VARIATIONS ON YOUR FAVORITES. ENJOY!

URME SURVEILLANCE PAPER MASK



BLUEBERRY PANCAKES

PROTEST PAN-FRIED PANCAKES

WANT TO ATTEND A RALLY BUT REMAIN ANONYMOUS? FOLLOW THESE SIMPLE INSTRUCTIONS TO WEAR THE FACE AND IDENTITY OF LEO SELVAGGIO AT PROTESTS AND OTHER ACTIVISM-BASED FUNCTIONS!

1. PRINT OUT AND ASSEMBLE THE URME SURVEILLANCE PAPER MASK BY EITHER VISITING THE URME SURVEILLANCE WEBSITE. MAKE ONE FOR YOURSELF, OUTFIT SEVERAL OF YOUR FRIENDS, OR BRING THEM TO THE RALLY FOR OTHERS.

2. RESEARCH YOUR LOCATION TO FIND OUT WHETHER THERE ARE ANY ANTI-MASK LAWS, AND DETERMINE FOR YOURSELF THE PROPER COURSE OF ACTION.

3. ATTEND THE RALLY AS LEO!

THERE ARE SO MANY FUN VARIATIONS ON THE PROTEST PAN-FRIED PANCAKE. DON'T BE AFRAID TO MAKE IT YOUR OWN! FOR EXAMPLE, TRY THE BLACKLIVESMATTER BLUEBERRY PANCAKE:

1. GATHER ALL ATTENDING WHITE PEOPLE AND HAVE THEM CHAIN TOGETHER TO FORM A SINGLE LINE OF DEFENSE AROUND PROTESTERS OF COLOR AND OTHER DISENFRANCHISED PEOPLES. IF THERE AREN'T ENOUGH WHITE ALLIES, THEN SIMPLY MAKE SOME USING URME SURVEILLANCE PAPER MASKS!

2. TASTY TIPS FOR WHITE PEOPLE USING THEIR OWN PRIVILEGE OR FOR THOSE BORROWING LEO'S:

A. BY BEING A VISUAL AND PHYSICAL BARRIER AGAINST LAW ENFORCEMENT, YOU CAN PROTECT PEOPLE OF COLOR BEHIND YOU FROM BEING TAKEN, ATTACKED, OR ARRESTED SIMPLY FOR PROTESTING.

B. DO NOT SPEAK, HOLD SIGNS, OR TRY TO CONTROL THE MESSAGE. THE BEST WAY TO SUPPORT THE PROTESTERS IS TO LET THEM CONTROL THE DIALOGUE.

C. RECORD ANY UNLAWFUL BEHAVIOR OR ACTION TAKEN BY LAW ENFORCEMENT AGAINST TARGETED PROTESTERS.

URME SURVEILLANCE IDENTITY PROSTHETIC

INDIVIDUAL WEARING PROSTHETIC

SWEET AND SOUR SURVEILLANCE

THIS RECIPE WILL ENABLE YOU TO SUBVERT LARGE FACIAL RECOGNITION SURVEILLANCE SYSTEMS BY WEARING A PHOTOREALISTIC 3D PRINTED PROSTHETIC OF LEO SELVAGGIO'S FACE IN SURVEILLED PUBLIC SPACES. CAMERAS EQUIPPED WITH RECOGNITION SOFTWARE WILL RECOGNIZE LEO RATHER THAN YOU, PRODUCING DISINFORMATION ABOUT WHO 'LEO' IS AND FURTHER INVALIDATING DATA STORED IN SURVEILLANCE ARCHIVES. YOU CAN DO THIS BY YOURSELF OR COORDINATE WITH GROUPS OF OTHER PEOPLE BY JOINING THE URME SURVEILLANCE FACEBOOK PAGE. TO PARTICIPATE, FOLLOW THESE SIMPLE INSTRUCTIONS:

1. PURCHASE A URME SURVEILLANCE IDENTITY PROSTHETIC DIRECTLY FROM THE MANUFACTURER, THATSMYFACE.COM, BY EMAILING SALES@THATSMYFACE.COM AND USING THE PROMO CODE 'LEONARDO'. ALTERNATIVELY, IF THE PROSTHETIC IS TOO COSTLY, YOU CAN DOWNLOAD A URME SURVEILLANCE PAPERCRAFT MASK BY VISITING THE URME SURVEILLANCE WEBSITE.

2. DETERMINE WHETHER YOUR AREA HAS ANY ANTI-MASK LAWS AND UNDERSTAND THEM BEFORE MOVING ON TO STEP 3.

3. CONSIDER CAMOUFLAGING THE PROSTHETIC OR PAPERCRAFT MASK BY ADDING SIMPLE-TO-FIND, EVERYDAY ELEMENTS TO YOUR OUTFIT, SUCH AS A COLLARED JACKET, A HAT, BANGS, SUNGLASSES, ETC. TO TASTE.

4. GO TO A PUBLIC SPACE THAT HAS SECURITY CAMERAS. TRY NOT TO INTERACT OR MAKE EYE CONTACT WITH OTHER PEDESTRIANS, AS THEY MAY DRAW SUSPICION IF YOUR PROSTHETIC IS DETECTED. WALKING NORMALLY AND IGNORING OTHER PEOPLE LIKE EVERY OTHER PEDESTRIAN IS THE BEST WAY TO BLEND.

5. LOOK UP AT SECURITY CAMERAS. WAVE IF YOU LIKE.

PRINTED PEA SOUP

THIS RECIPE WILL PROVIDE YOU WITH THE URME POLYGON, A 3D MODEL OF LEO'S FACE, TO USE IN ANY NUMBER OF APPLICATIONS. THE MODEL IS UNDER CREATIVE COMMONS AND CAN BE USED FOR CHARACTERS IN GAMES, ANIMATIONS, DIGITAL FABRICATIONS, ETC. IN ONE EXAMPLE, FACES IN 3D MODELS OF HISTORICAL FIGURES' SCULPTURES ARE REPLACED WITH THE URME POLYGON MODEL AND THEN 3D PRINTED. PRINT IT, MANIPULATE IT, OR MAKE ART WITH IT BY FOLLOWING THESE INSTRUCTIONS:

1. DOWNLOAD THE URME POLYGON MODEL.

2. IF YOU ARE AN EXPERIENCED DIGITAL FABRICATOR, CONSIDER USING OPEN SOURCE SOFTWARE LIKE BLENDR TO WORK WITH THE MODEL.

3. IF YOU ARE NEW TO DIGITAL FABRICATION, CONSIDER USING AN APPROACHABLE ONLINE PLATFORM LIKE TINKERCAD TO START OUT.

4. ONCE YOU HAVE WORKED WITH LEO SELVAGGIO'S FACE, CONSIDER MAKING A 3D MODEL OF YOUR OWN FACE USING YOUR CELL PHONE AND PHOTOGRAMMETRY SOFTWARE LIKE 123D CATCH OR REMAKE.

BAKED BIO BEAN

THIS RECIPE WILL PROVIDE YOU WITH A BIOLOGICAL SAMPLE OF LEO'S DNA. CULTIVATE CELLS, MAKE CLONES, DOCTOR DNA TESTS, ETC. THE POSSIBILITIES ARE ENDLESS!

1. EMAIL LEO SELVAGGIO AT LEO.SELVAGGIO@GMAIL.COM WITH THE SUBJECT 'COOKBOOK: BIO SAMPLE', ALONG WITH YOUR MAILING ADDRESS.

2. ALLOW 2 WEEKS FOR PACKAGE TO ARRIVE.

3. OPEN PACKAGE.

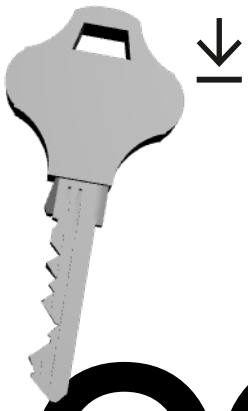
SUBMIT YOUR OWN RECIPE

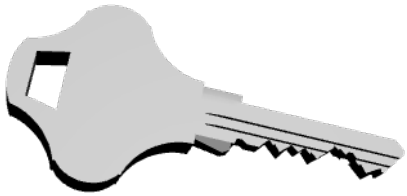
DO YOU HAVE AN INCREDIBLE IDEA FOR A RECIPE? URME KITCHEN INCORPORATED ENCOURAGES YOU TO SUBMIT YOUR RECIPE TO LEO.SELVAGGIO@GMAIL.COM WITH THE SUBJECT LINE 'LEO-NAISE RECIPE'! YOU WILL GET TO COLLABORATE SIDE BY SIDE WITH MASTER CHEF LEO SELVAGGIO, CREATOR OF THE LEO-NAISE PRODUCT YOU KNOW AND LOVE. HELP US FIND EVEN MORE EXCITING AND DYNAMIC USES FOR LEO, AND MAKE LEO-NAISE A HOUSEHOLD NAME!

Anonymous	Occupy Gramercy	2016-2017
Author	Project	Year

#recipe	#resistance	#break
Format	Theme	Action

3D modelling of a key to Gramercy Park, for the purpose of an occupy action in 2017





OCCUPY GRAMERCY

Gramercy Park, the only remaining private park in Manhattan, is a monument to an outmoded aristocracy guarded only by a wrought-iron fence – neither of which have a place any longer in our current moment in history. Gramercy Park is not unique by virtue of its excellence as a public park – quite the opposite. It is unique in that it is perhaps the most public display of New York wealth's indifference at the problems of inequality in the urban fabric of the city today.

I propose to provide public access to Gramercy Park on the first Saturday in May 2017, in place of the former Gramercy Day, ten years after the Gramercy trustees dissolved the one day a year the public was admitted into the park. By making freely available a printable, digital model of the key, the physical and social barriers to park entry will be dissolved for the day, if not permanently.

The project seeks to help observers and participants alike question the role and legitimacy of private ownership of limited green space within the city, as well as the nature of the 'ornamental' park itself – a vestige of 19th century urban design and landscape architecture. The reflexive reason most often given for maintaining the current hegemonic relationship is that if the public were to be let in, the park would be made less beautiful, somehow. I would like the public, including residents of Gramercy Park, to consider the possibility that the park could be made more beautiful by welcoming the greater public of New York City.

#Additivism has the potential to subvert not only the physical security that the locks to the park provide, but more crucially the status keys convey to their owners. The lock and key system provides security by means of exclusivity – it relies on the scarcity of a physical good. The organization of matter forms the intangible – the notion of security itself; #Additivism enables the reversal of this flow – with data becoming corporeal, the immaterial intruding into the physical world, providing new opportunities for social organization.

MATERIALS REQUIRED:

- Camera
- Photos of existing key to be duplicated – guests of the Gramercy Park Hotel have posted photos of the key to the park on the web
- Photo of the type of key to be duplicated with dimensions for scale – does not need to be the desired key, but one from the same model
- 3D modeling software of your choice
- 3D printer

PROCEDURE:

1. Take a photo of the lock. Try to ensure that the picture is taken parallel and as close to the plane of the lock face as possible.
2. Upload the photo to Keysforge and generate a key blank.
3. Trace the outline of the desired key from the photo.
4. Scale the outline according to the image with dimensions.
5. Using the traced outline, 'cut' the key blank.
6. Working from reference images of the desired key, make any necessary adjustments & refinements to the key.
7. Export the 3D model and print your key.

Gabriel Menotti
Author

Spare Part: Religious Iconophilia and 3D Replication
Project

2016
Year

#recipe
Format

#figures
Theme

#collide
Action

On the emulation of religious relics

SPARE PART: RELIGIOUS ICONOPHILIA AND 3D REPLICATION

2/2

The Stanford Computer Graphics Laboratory has an online 3D Scanning Repository, where it has published some of the first models produced during its early research of the technology, in the 1990s. There, it is possible to find not only the original data of the widespread Stanford Bunny, but also less known virtual replicas of a Happy Buddha and of the Christian angel 'Lucy', among others. The page sports a very peculiar notice regarding 'inappropriate uses of these models', which reads:

> *[P]lease remember that several of these artifacts have religious or cultural significance. […] Keep your renderings and other uses of these particular models in good taste. Don't animate or morph them, don't apply Boolean operators to them, and don't simulate nasty things happening to them (like breaking, exploding, melting, etc.).*[1]

The warning is clearly addressed to the agnostic other: to the scientist for whom those scans and polygonal meshes do not have any special meaning if not as pioneering assets in the history of computerized representation. A believer would not have to be reminded that an expression of the sacred, as abstract as it may be, bears a trace of the sacred itself. In the Christian tradition that permeates western thought, creation is imbued with image and likeness. While the worldly aura of the artifact deteriorates with each and every copy, the divine reality with which it has been invested seems to subsist. Thus, making and preserving these objects – or, in some cases, to destroy them – become exercises of reverence.

A number of religious practices deploy mechanical reproduction for devotional purposes, such as the fabrication of holy figurines, prayer cards, and wax ex-votos. The mimetic aptitude of 3D replication technologies seems to make them particularly fit for these and even more complex iconophilia. In 2014, an international group of forensic experts, coordinated by the Anthropological Museum of Pádua, used a scan of the skull of St. Anthony to perform a digital reconstruction of his face.[2] The resulting model was 3D printed in color, resulting in the most faithful bust of the saint to date, later donated to the basilica that holds his mortal remains.

The emulation of relics thus shares with experimental archaeology an eagerness to recover long-lost presences by the means of simulacra, up to a point where they become the same. What does it mean when holographic projection is used to recreate the giant image of the Bamiyan Buddhas in their original site?[3] Is it really a manifestation of our secular, 'civilizing' concerns for cultural heritage, set against the Taliban's iconoclasm? Perhaps what lies under the global preservationist agenda is just a dispute of dogmas, between different ways of accounting for the metaphysical.

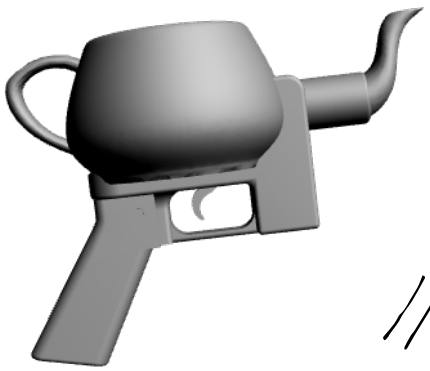
1 graphics.stanford.edu/data/3Dscanrep
2 www.messengersaintanthony.com/messaggero/pagina_articolo.asp?IDX=699IDRX=185
3 www.youtube.com/watch?v=JI4ozg4iEEw

Kyle McDonald	Liberator Variations	2013
Author	Project	Year

#methods	#kipple	#detach
Format	Theme	Action

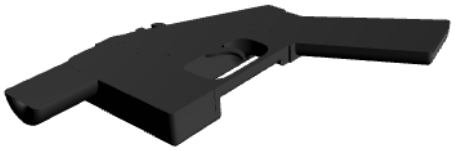
A collection of absurd variations on the 3D printed gun

LIBERATOR VARIATIONS



On May 6, 2013 a small pro-weapons organization called Defense Distributed shared a useless plastic gun called 'The Liberator', available for anyone to download and potentially harm themselves with. Assuming they have access to both ammunition and a very expensive 3D printer.

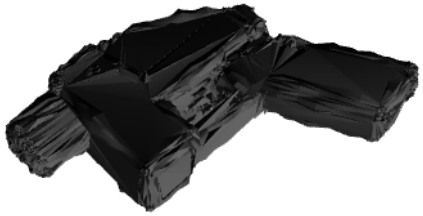
A few days and 100k+ downloads later, the US Department of State got scared enough to order Defense Distributed to take down the file. Enthusiasts promptly moved the file to a torrent, tracked by The Pirate Bay, making it harder to regulate and creating significantly more publicity. Pirate Bay users could only maintain interest for approximately four pages of comments.



Perhaps the file on The Pirate Bay wasn't the original? Perhaps someone made minor modifications to make it even more unusable than it already was? I had to wonder, and invited others to wonder with me.

The government's reaction, and most people's reaction to the Liberator, seemed primarily driven by fear. The fear of an undetectably lethal society, where forbidden objects can no longer be regulated. Where 'society' itself breaks down, because access to 3D printers somehow tear up the social contract that keeps us at a distance from the objects that we can use to harm each other.

I believe that networked media, in its current form, cannot be regulated to such a fine degree as to deny access to specific files; and certainly not specific kinds of files. None of the regulations on physical goods can practically be applied to digital goods. The historical foundations of file sharing (music, movies, applications) have demonstrated this, but forbidden physical items exacerbate the discrepancy. Soon, machines that print arbitrary chemical compounds or organisms with arbitrary genetic information will similarly challenge drug and biochemical warfare regulations. When something is impossible to regulate, it makes more sense to focus on education and discussion than censorship.



In response to The Liberator, I borrowed an idea from 'One coffee cup a day' by producing several absurd variations on the original file. Ideally, they should make people feel like there's nothing sacred or singular about 'that 3D printed gun file' but that it's something that can be remixed, appropriated, redirected, repurposed. That it's not just 'floating around out there', or in the hands of a few people, that it's not something to be feared, but treated critically, carefully, humorously, seriously.

What is there to be afraid of when we're all in this together? When we all feel empowered, in control, able to participate in and guide culture? There is only fear when we feel disempowered, when we lack understanding, when we are censored, when we lack input or control and are instead being controlled.

Within F.A.T. there is significant disagreement about the right way we can engage with unregulated 3D printed weapons. Personally, I want to live in a society where no one owns or has an incentive to own a weapon, but there is also no stigma or fear about discussing them.

Matthew Hollings
Author

print_music
Project

2016
Year

#methods
Format

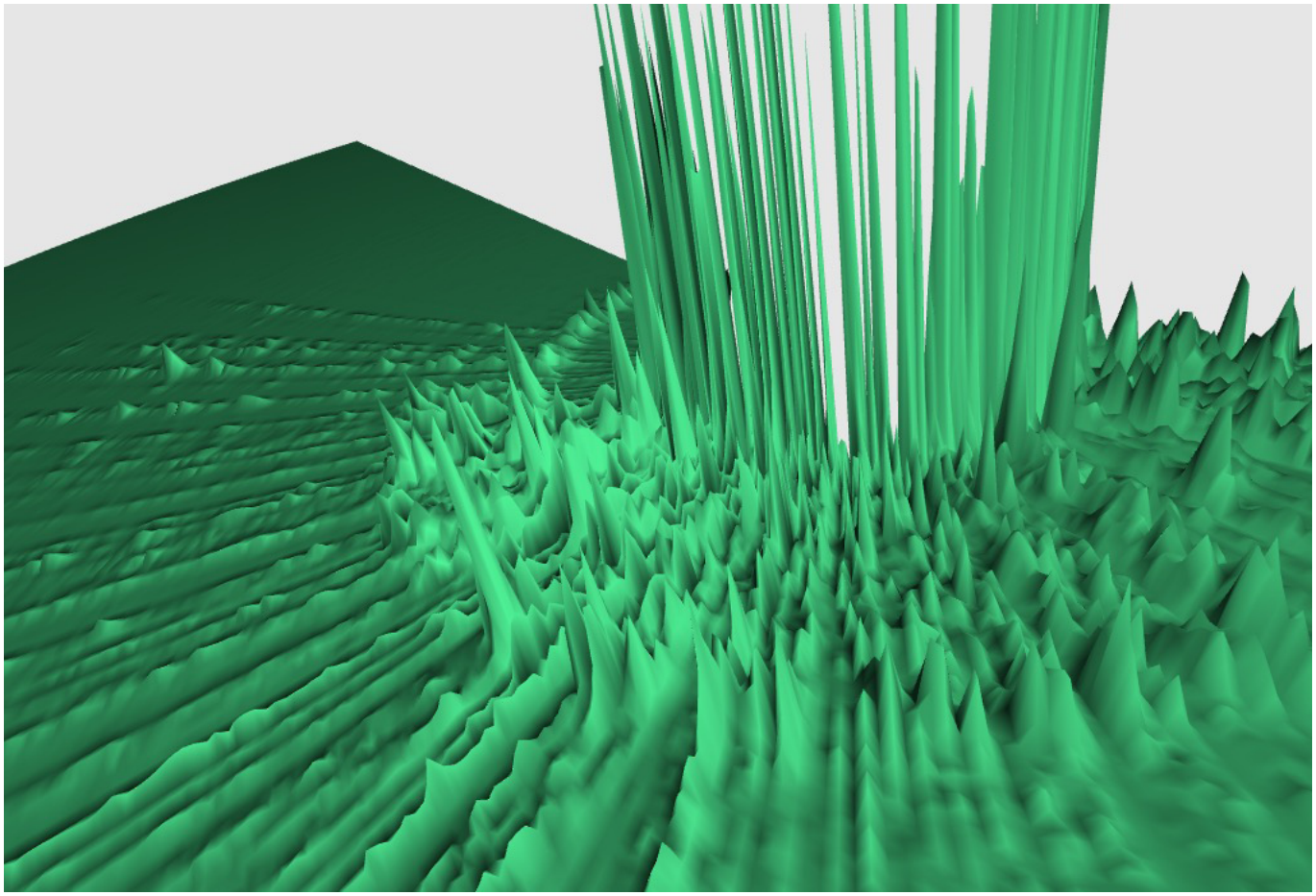
#sense
Theme

#morph
Action

An openFrameworks app which renders a 3D printable solid form from a .wav file

1/2

PRINT_MUSIC

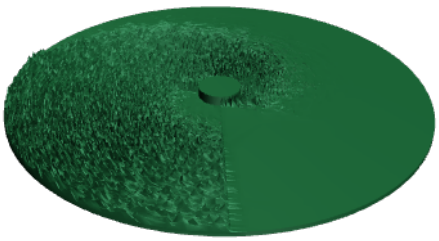


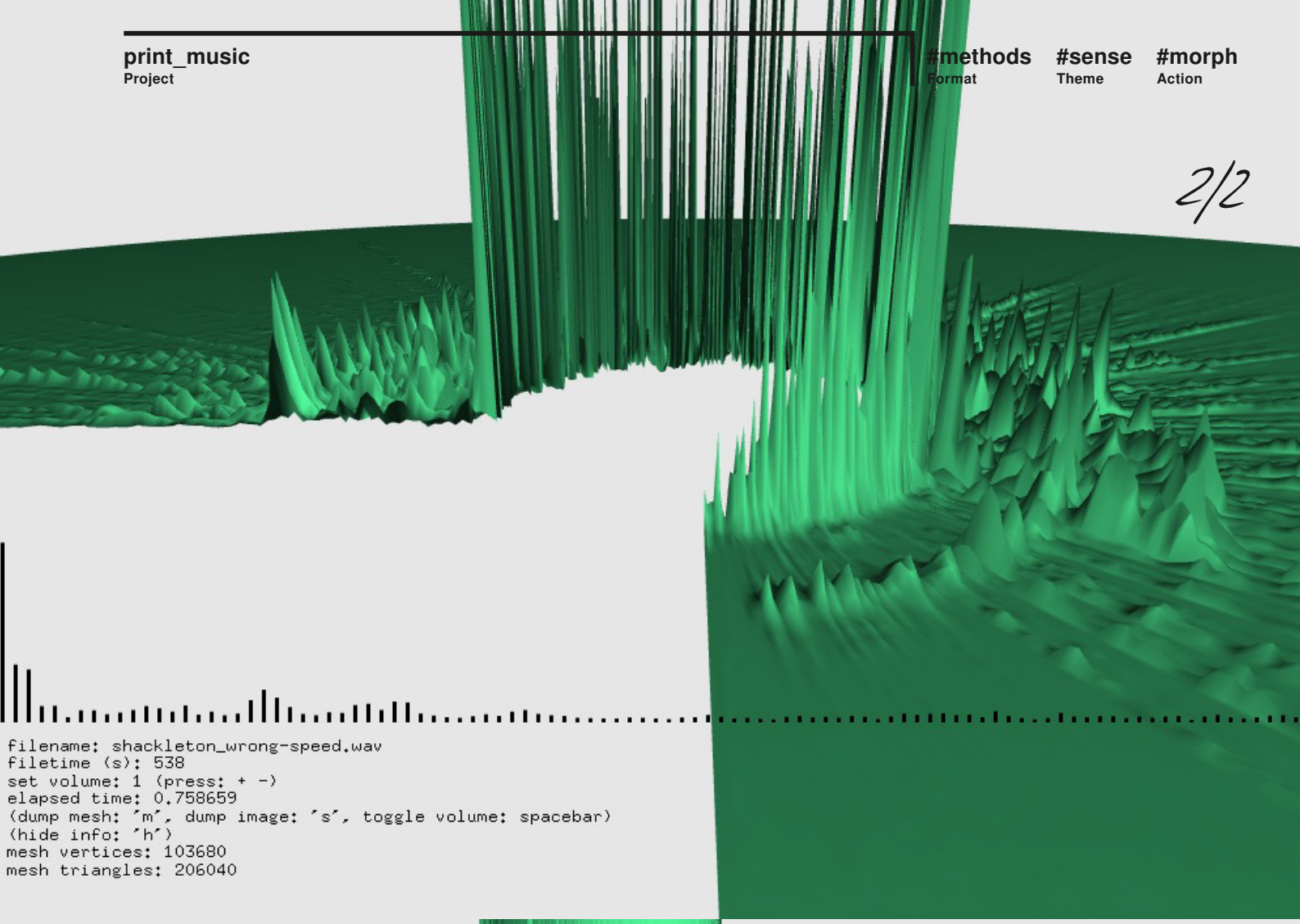
Algorithmic art descends from early 20th century avant-gardes as an offshoot child of constructivism and futurism. #Additivism completes the territorialization of sculpture by digital technologies. Computed image construction was first explored in the 60s by the Algorists and now printing technologies open up 3D form to the same analytics. Form can be constructed in ways of which Boccioni only ever dreamed.

The potential of 3D printing for a transformation of society and material production seems clear. Accelerated by the Internet simulated and virtual space becomes realizable, the simulation feeds directly back into the real from which it came.

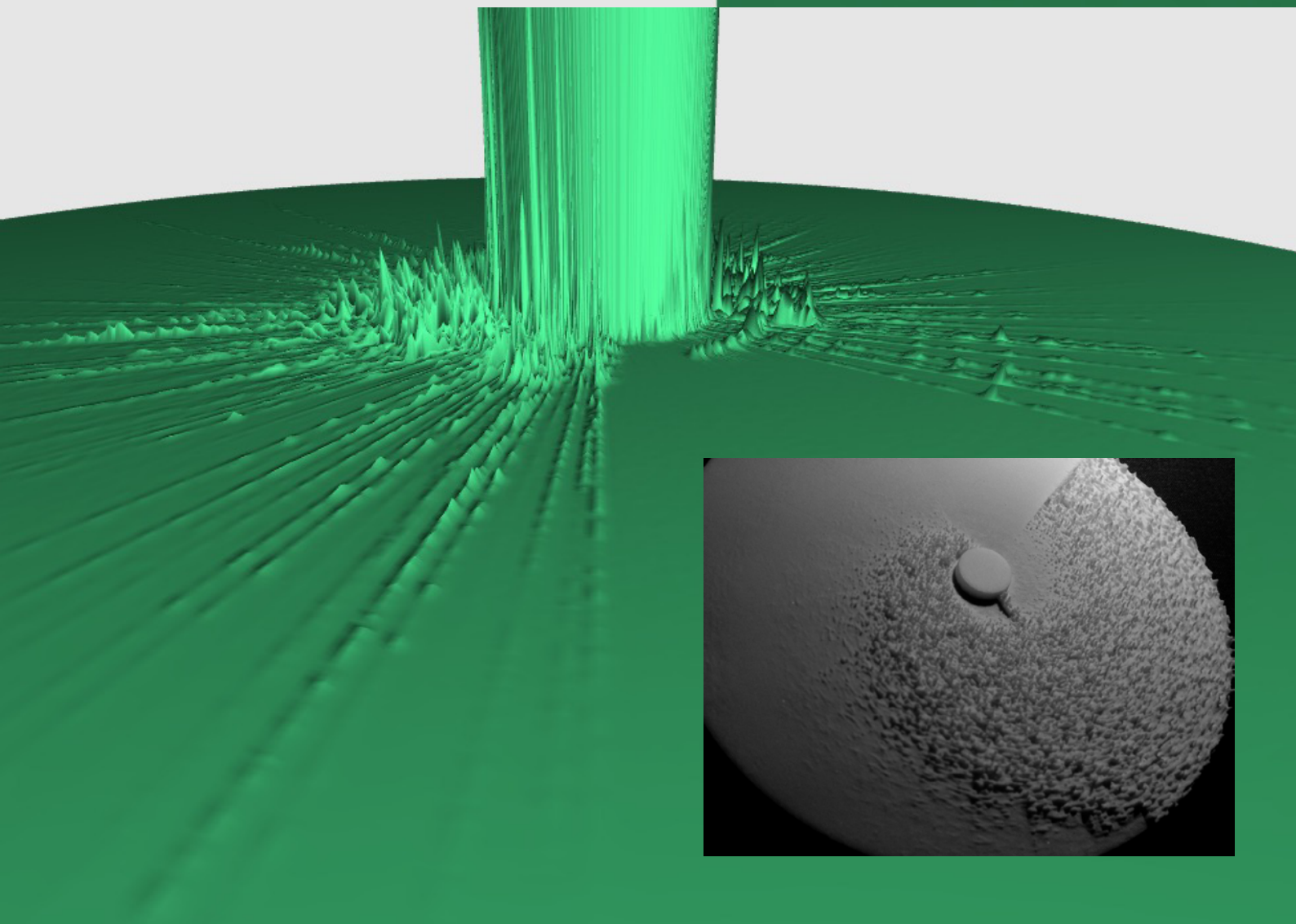
print_music is an attempt to explore this path, to render sound materially, to reify audible sensations. 3D mesh files that are generated directly from a digitization of a vinyl record, converted from analogue via digital back to analogue, best express the idea behind print_music. Computation processes transform the analogue data stream, the vibrational sampling of a surface, into another form; velocity and time are compressed into space. Energy is slowed to a visible viscosity.

The failure of Muybridge to capture movement leads to the discovery of the form of movement in space.





```
filename: shackleton_wrong-speed.wav
filetime (s): 538
set volume: 1 (press: + -)
elapsed time: 0.758659
(dump mesh: 'm', dump image: 's', toggle volume: spacebar)
(hide info: 'h')
mesh vertices: 103680
mesh triangles: 206040
```



THE PERSPECTIVE OF PRINT

"THE PERSPECTIVE OF THE PRINTER IS THERE, LURKING WITHIN ITS PAGES, WAITING FOR ITS READERSHIP TO REALIZE ITS SUBVERSIVE POTENTIAL."

How can we read printing, the narrative of print, from the perspective of the printer? While it may be impossible to accurately imagine the ontology of modern technology, science fiction offers no shortage of attempts to do so. By proposing that we imagine such a perspective, SF and certain strands of speculative theory force us to acknowledge the contingency of human values such as authenticity and self-ownership. We might say that they provide us with recipes for reimagining our relationship to technology, and how this relationship reconfigures our material being. But these recipes need not yield homogeneous results; in fact, they encourage us to experiment, to explore new combinations of human and machine, new hybrid models. These models can often be difficult to detect or identify, thereby necessitating our attention toward the subtle and the subterranean – the layers of meaning and matter that subtend the surface patterns, like the fossil fuels that circulate beneath our feet. To locate the perspective of the print, we must excavate the text.

At the end of his 1956 short story, 'Pay for the Printer', science fiction author Philip K. Dick offers his readers a moment of humanistic hope in the midst of nuclear devastation. The narrative depicts a world in the aftermath of nuclear war, in which humanity has come to rely on the replicative properties of an alien species known as the Biltong, which have the biological capacity to create functional 'prints' of any object in their environment – even alcoholic beverages, including whiskey. However, by the conclusion of Dick's story, the Biltong have grown weak in the gravitational climate of earth, and humans are beginning to search for other ways to survive. In a closing conversation, one character shares knowledge of survival skills with another:

'And you're printing tools? Like that knife?'

Dawes laughed long and loud. 'The word isn't print – the word is build. We're building tools, making things.' He pulled out the crude wooden cup and laid it down on the ash. 'Printing means merely copying. I can't explain to you what building is; you'll have to try it yourself and find out. Building and printing are two totally different things.[1]

The distinction between *printing* and *building* bespeaks a conceptual binary that directs Dick's writing in an ideological manner: *labor* versus *work*, respectively. Labor corresponds to a hierarchy of organization – typically capitalist organization, portrayed in Dick's imagined scenario as a residual institution reinforced by a society reeling from post-capitalist collapse. Work, in contrast, corresponds to a perceived immediacy with the natural world – a reworking of nature to create a system of objects, or 'world of things' in Hannah Arendt's distinction.[2]

Dick's short tale clearly elevates work as the more desirable of the two productive forms, evinced most clearly in Dawes's final line, uttered seemingly to himself as he admires a rare object in his collection, a Ronson cigarette lighter. As Dawes ponders the unlikelihood of being able to craft such complex objects in his lifetime, he casts a hopeful forecast for the future: ''Not in our time', he said, and closed the box. 'Too many steps in between.' His lean face glowed suddenly, a flicker of joyful anticipation. 'But by God, we're moving that way'' (252). Dawes sympathizes with the forced bio-labor of the Biltong, and looks forward to a time when humans rediscover the means of handcrafting their own tools. This attitude incorporates various ideological elements: natural versus artificial, original versus simulacrum, self-reliance versus dependency. Dawes's vision of a return to primitive modes of human productivity accomplishes two primary goals: it reestablishes an epistemological model of the human subject as the possessor of his labor (and this subject is largely gendered as male in Dick's story), and it emancipates the Biltong from their submissive position as exploited labor.

Presented in this manner, completed by the exploitation and suggested murder of Biltong by humans, a return to a kind of 'tool-being' appears ethically desirable.[3] However, this approach also renders Dick's story as resolutely humanist in a particularly reactionary fashion; unable to acclimate themselves to the earth's gravity, the Biltong become an extraterrestrial force that merely reveal to humans how they have lost their humanity, so to speak (this frequently manifests in Dick's stories through the loss of language – humans forget words such as 'rain' or 'build'). The only way forward is backward. How might we perceive, in a speculative fashion, a form of nonhuman agency at work in the premise of Dick's story? The author portrays the Biltong as an alien race that thrives on imitation, on replication; the Biltong must continually produce copies of their found environment. Yet despite Dick's resistance to the concept of the 'copy', or the simulacrum, he also portrays the Biltong in a highly sympathetic manner, eliciting horror from his readers as Dawes

1 Philip K. Dick, 'Pay for the Printer', *The Philip K. Dick Reader*, New York: Citadel Press, 1987, p. 252 (all further references cited in-text).
2 See Arendt, *The Human Condition*, Second Edition, Chicago: U of Chicago P, 1998, p. 7.
3 See Graham Harman, *Tool-Being:* Heidegger and the Metaphysics of Objects, Peru, IL: Open Court Publishing, 2002.

witnesses a struggling Biltong try to defend itself against an enraged crowd near the story's conclusion. The Biltong, despite their imitative behavior, are biologically hardwired to be imitative – they are, we might say, *authentic* in their imitation.

Human manipulation of the Biltong does not correspond to any biological necessity, but rather to the demands of late capitalist consumerism. The Biltong find welcome on earth because of their capacity to reproduce, or 'print', objects, but are derided and even attacked when they fail to print copies that last. In the story, the increasing inutility of objects happens to correspond with the gradual withering of the Biltong under terrestrial conditions, but it also illuminates a misinterpretation from humans: that the Biltong are no longer functioning properly when they cease to produce objects that function properly. The primary motive of the Biltong is to reproduce objects, to reproduce their environment – in this sense, their use for objects does not correspond with human use. The plot dilemma of 'Pay for the Printer' derives from a scenario of scarcity, but it also reflects a specific human anxiety toward the material world: that base matter (excess matter, the waste of the world) pursues paths that may not conform to human needs.[4]

The anxiety of base matter is magnified and exacerbated to a radical degree in Reza Negarestani's 2008 work, *Cyclonopedia: Complicity with Anonymous Materials*. Recent years have seen an increasing interest in Negarestani's fascinating and perplexing text (referred to hereon as Cyclonopedia); most significantly, it enjoyed the attention of a 2012 symposium, the findings of which were subsequently published in the collection *Leper Creativity*: Cyclonopedia Symposium. Participating in the symposium, literary critic Kate Marshall addressed Cyclonopedia as a novel, and how it troubles our conventional notions of narrative and point-of-view: 'Petroleum, the 'sentient entity' narrates, but from a 'nethermost' point of view. And this too is unstable, because petroleum is the point of view itself.'[5] How can oil narrate? Marshall settles on no single theory of narratology, but concludes that *Cyclonopedia* is doing something new; it is a textual assemblage that refuses to abide by conventional narrative laws.[6] It locates point-of-view in a liminal, nonhuman space, a 'nethermost' region.

Dick's 'Pay for the Printer' adopts a resolutely human perspective, and thereby concludes on a resolutely humanist note; but another perspective resides within the text, a perspective that may reveal itself as an effect of 'hidden writing', as Negarestani discusses it in Cyclonopedia. For Negarestani, hidden writing designates a 'subsurface life' that 'can only be exhumed by distorting the structure of the book or the surface plot.'[7] Negarestani weds concept and image in his primary figure for hidden writing: the '( )hole complex', or the industrial process of drilling for oil. This economic and political process reflects the complementary 'plot holes' of hidden writing: 'psychosomatic indications of at least one more plot densely populating itself in the holes it burrows through and digs out' (61). I want to emphasize one such plot hole in Dick's story, which manifests also in a literal holey-ness: the frustrating decomposition, early in the story, of a printed gasoline pump. As a poignant image of breakdown, the pump also invokes the raw materials utilized for printing – oil, petrol. The reprinted gasoline itself spills out from the eroding pump, confounding the cycle of appropriation, the exploitation of dead matter. It is at this moment that the pump morphs from an object to what Bill Brown identifies as a *thing*: 'We confront the thingness of objects when they stop working for us', Brown writes; 'The story of objects asserting themselves as things, then, is the story of a changed relation to the human subject and thus the story of how the thing really names less an object than a particular subject-object relation.'[8] In this sense, the pump attests to its own thingness by *dematerializing its usefulness* – it communicates its own agency, its radical materiality, by dematerializing.

Of course, the pump does not fantastically dematerialize, but rather redistributes its material composition; to paraphrase N. Katherine Hayles, the pump loses the body of its information.[9] The Biltong rely on information in order to make prints; they need objects in order to replicate them. Information, however, is virtual; as Bruce Clarke explains, information 'does not exist until an observing system (such as a mind) *constructs it*.'[10] It is incumbent

4 Base materialism is a concept attributable to Georges Bataille. For more on this intriguing theory, see Benjamin Noys, 'Georges Bataille's Base Materialism', *Cultural Values* 2.4 (1998): p. 499-517.

5 'Cyclonopedia as Nºvel (a meditation on complicity as inauthenticity)', *Leper Creativity:* Cyclonopedia *Symposium*, eds. Ed Keller, Nicola Masciandaro, and Eugene Thacker, Brooklyn: punctum books, 2012, p. 155 (all further references cited in-text).

6 'Laws' operates here as a rhetorical term. The accumulation of work in the field of narratology cannot amount to a constitution of prescriptive laws, but only an observational descriptive account of various modes of writing. Literary critics are continually fascinated by texts that manage to overcome these 'laws' in exciting and challenging ways. We are drawn, I mean to say, to the lawbreakers.

7 Reza Negarestani, *Cyclonopedia: Complicity with Anonymous Materials*, Melbourne: re.press, 2008, p. 62 (all further references cited in-text).

8 Bill Brown, 'Thing Theory', *Critical Inquiry* 28.1 (2001): p. 4.

9 See N. Katherine Hayles, *How We Became Posthuman*: *Virtual Bodies in Cybernetics*, Literature, and Informatics, Chicago: U of Chicago P, 1999, p. 50 (all further references cited in-text).

upon us, as critical readers of Dick's short story, to acknowledge observing systems other than human beings. The Biltong, in other words, perceive matter in an informationally different way than humans; and the decomposition of objects, the loss of their human utility, does not register for the Biltong as a setback, but as a redistribution of raw materials. The relationship of the Biltong to unadulterated, disorganized, 'dirty' matter appears to be one of intense immediacy: they discover their own being in the excess of detritus.[11]

The discrepancy between the human and Biltong perspectives derives from an augmentation of scale. What humans cannot help but view in an egocentric manner, the Biltong perceive in relation to a set of larger circumstances and conditions; and what human beings view linearly, as surplus and scarcity, the Biltong perceive as systemic symbiosis. The hapless Biltong, whose death the text implies just prior to the conclusion, cannot understand why its prints are useless. This argument yields consequences not merely for the thematic concerns of the text, but also for the possibility of any conventional 'reading' of the text; the Biltong's behavior of reorganizing raw materials for various productive reasons, which may not necessarily be *human reasons*, serves as an analog for the kind of reading I am arguing for. To read a 'privileging of the print' in Dick's story, we have to reorganize its raw materials; and this reading offers a perspective for not only the alien Biltong of Dick's story, but also for the very perspective of media itself – for the technology of the printer.

Reorganizing the raw materials of Dick's story is analogous, I want to suggest, to uncovering its plot holes, the Negarestanian 'hidden writing' of the text. However, try as we might, we cannot achieve the perspective I am arguing for purely by altering the text; we must also alter our own observational apparatus, to embrace what Hayles has called 'machine reading.'[12] In her extensive discussion of the Digital Humanities, Hayles suggests that machines might provide models of textual consumption that are equally as valuable as the humanist model of reading. Noting that human beings are 'notoriously egocentric', she advances the possibility that if 'events occur at a magnitude far exceeding individual actors and far surpassing the ability of humans to absorb the relevant information, however, 'machine reading' might be a first pass toward making visible patterns that human reading could then interpret' (29). Certain information can only be accessed by computing technologies, and can only be efficiently organized at the level of complex systems before any attempt can be made at interpretation.

Mapping Hayles's commentary onto our discussion of Dick, we might say that a reading that privileges the print can only be performed by print technology; but such a statement seems obvious and virtually tautological. We must remember that Dick's story was written by a human and published for human consumption. The critical value of this text lies in its ability to imagine an alternative reading within the conditions depicted in its content. Formally, Dick's story is conventionally realist; but it is a realism that gestures toward its own fragility and, perhaps, futility. The perspective of the printer is there, lurking within its pages, waiting for its readership to realize its subversive potential.

Privileging the print in this manner also repositions the human in an epiphenomenal manner – the human emerges as a side effect of crude material processes, but perceives itself retrospectively as the producer and organizer of those processes. Humanity claims ownership, authenticity, and identity over the frustrating fluidity of matter. Dick's story, despite its conclusion of optimistic humanism, subtly reminds its readers of the carelessness of matter. Negarestani's text takes this issue even further, positing global patterns of material production and consumption in which humans are only tangential agents (and agential tangents). For the machine-actors of these texts (Biltong, oil, the Middle East, matter itself), the material systems of the universe comprise patterns that no human narrative can capture – narratives that persistently collapse into solipsism and egocentrism, that desperately seek the linearity of progress. The perspective of the print, in contrast, knows no progress. It can only exist at the edges of thought, in the shadows where humanity has located the horror of its existence. It looks back at us, thoughtfully yet dismissively, from a nethermost point of view.

10 See Bruce Clarke, 'Information', ***Critical Terms for Media Studies***, W.J.T. Mitchell and Mark B.N. Hansen, eds., Chicago: U of Chicago P, 2010, p. 157 (all further references cited in-text).

11 For more on dirty matter, see Jussi Parikka's 'New Materialism as Media Theory: Medianatures and Dirty Matter', ***Communication and Critical/Cultural Studies*** 9.1 (2012): p. 95-100.

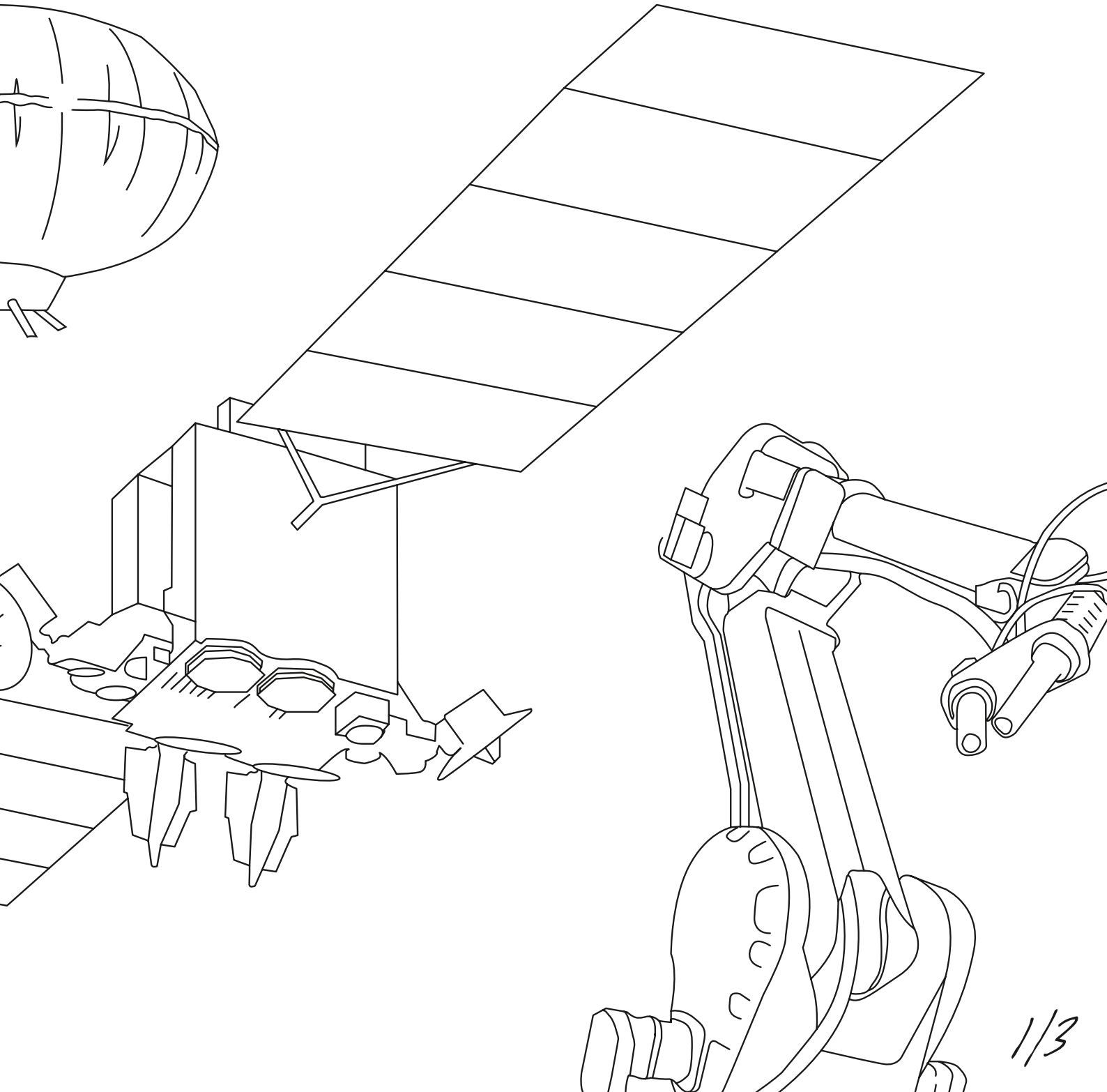
12 See N. Katherine Hayles, ***How We Think: Digital Media and Contemporary Technogenesis***, Chicago: U of Chicago P, 2012, p. 29 (all further references cited in-text).

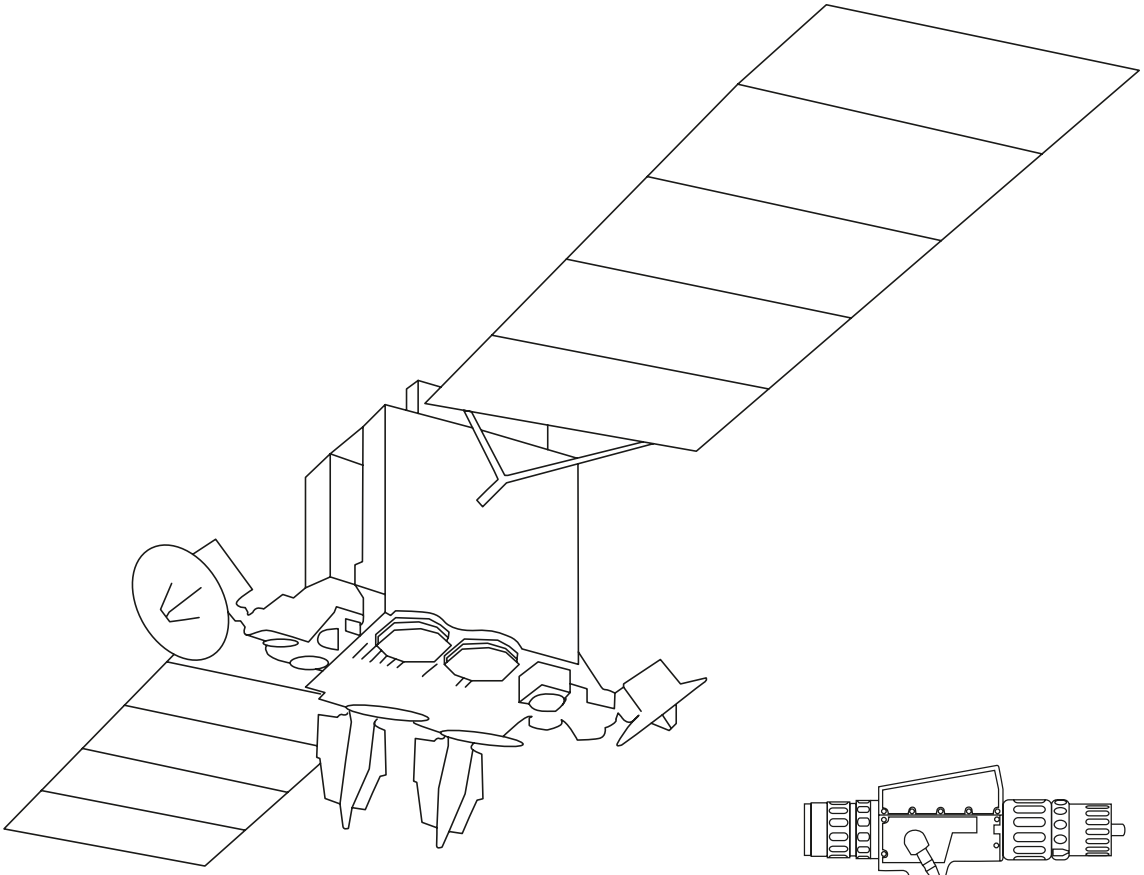
Patrick Romeo	DIY NanoSatellites	2016
Author	Project	Year

#fabulation	#outside	#collide
Format	Theme	Action

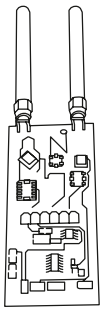
Parasitic nanosatellites designed to swarm and cannibalise their interplanetary cousins

DIY NANOSATELLITES

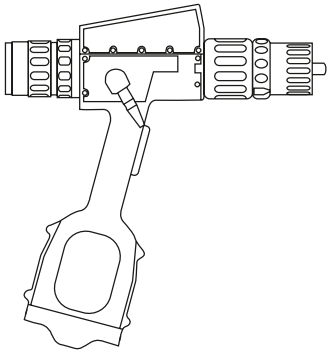




An example of a declassified NSA spy satellite that could be swarmed or disassembled remotely.



Inexpensive targeted-bandwidth signal jammers could prove useful for counter-surveillance and obfuscation.



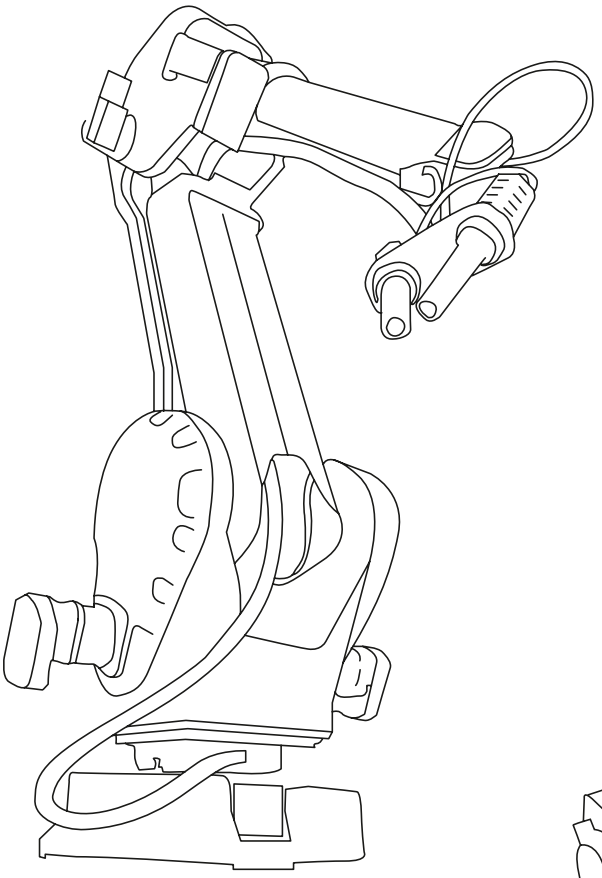
The NASA PGT (Pistol Grip Tool) is an example of an appendage that nanosats would need to cannibalize parts from other satellites.

The DIY Nanosatellite project began with a more terrestrial slant: examining the world of propeller-based drones, and designing ways in which they could be modified or repurposed for creative or potentially nefarious goals. It's not difficult to imagine a simple Arduino-based solenoid actuator system to hold a spray paint can and wreak havoc on a city's surveillance camera infrastructure, or to strap a payload of any sort (imaging, incendiary, biotech) to any off-the-shelf flying machine. The vectors are endless and often intimidating. That being said, the myriad possibilities inherent in artificial geosynchronous or low-earth orbit (LEO) satellites are more intriguing for the purposes of this document.

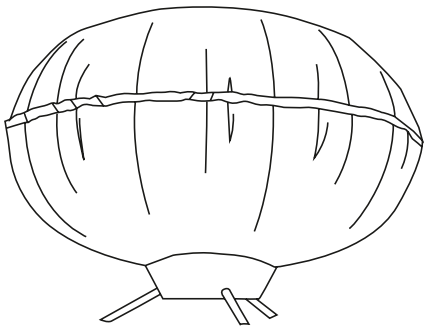
The first functional hand tool was recently digitally printed aboard the International Space Station. The environmental parameters in space are admittedly extreme, especially on highly exposed modular platforms such as the CubeSat. Research is being done to further the ability to print materials in microgravity and in a vacuum (and with extremes of UV degradation for current plastic print media).

This conceptual foray will serve to demonstrate several ideas related to swarm intelligence via multiple nanosatellites working in tandem, counter-surveillance via various forms of sabotage and watchdog-style accountability, and cannibalistic or parasitic functions via collection of space junk and milling and recycling it into new functional parts using direct-metal laser sintering (DMLS). Given that the cost prohibition of most space research is dependent on launch costs, "mining" existing raw material already at LEO provides an enormous fiscal benefit.

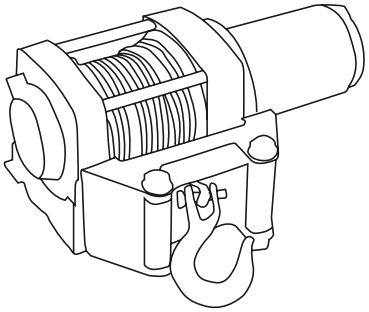
The basic research materials and kits necessary for these plans are widely available. Temperature regulation, sensors, imaging, launching, shielding, solar power, battery storage, and communications are already well-established technologies for satellite exploration. There are certain persistent technical hurdles that still exist for cheap and robust small-scale satellites:



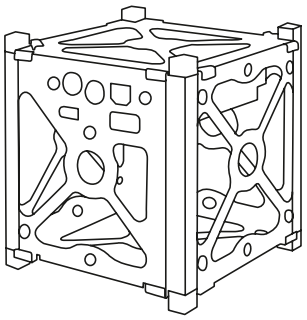
DMLS (Direct-Metal Laser Sintering) on a multi-axis arm could print using reclaimed metals found in space.



Aluminized Mylar provides both visual and coms disruption. Could be deployed around an existing satellite much like a trash bag.



Tow lines added to nanosats could piggyback on existing satellites to cut down propulsion cost. (These could also be 3D printed.)



This is the chassis of the CubeSat.

1. Micropropulsion
Propulsion has been a limiting factor for satellites for many years. Compressed-fluid systems are notoriously unreliable in the extreme environments associated with space, require large and heavy payloads, and have a limited lifespan. Using MEMS (micro-electromechanical systems) to create small amounts of thrust in a very low-form factor can solve this issue and can last for an appreciable amount of time (months to years depending on duty cycles).

2. Target Acquisition
If looking for a specific satellite or object, targeting, tracking, and adhering to the target provides a piggyback propulsion advantage (magnets, adhesives, or printed tow lines would function well depending on the target material specs).

3. Tasking
Nanosatellites tend to lend themselves to singular tasks. How do we create a do-it-all “everything bagel” satellite? Perhaps use a cluster of small satellites that come together to do more complex tasks in a swarm, or can temporarily assemble into functional shapes.

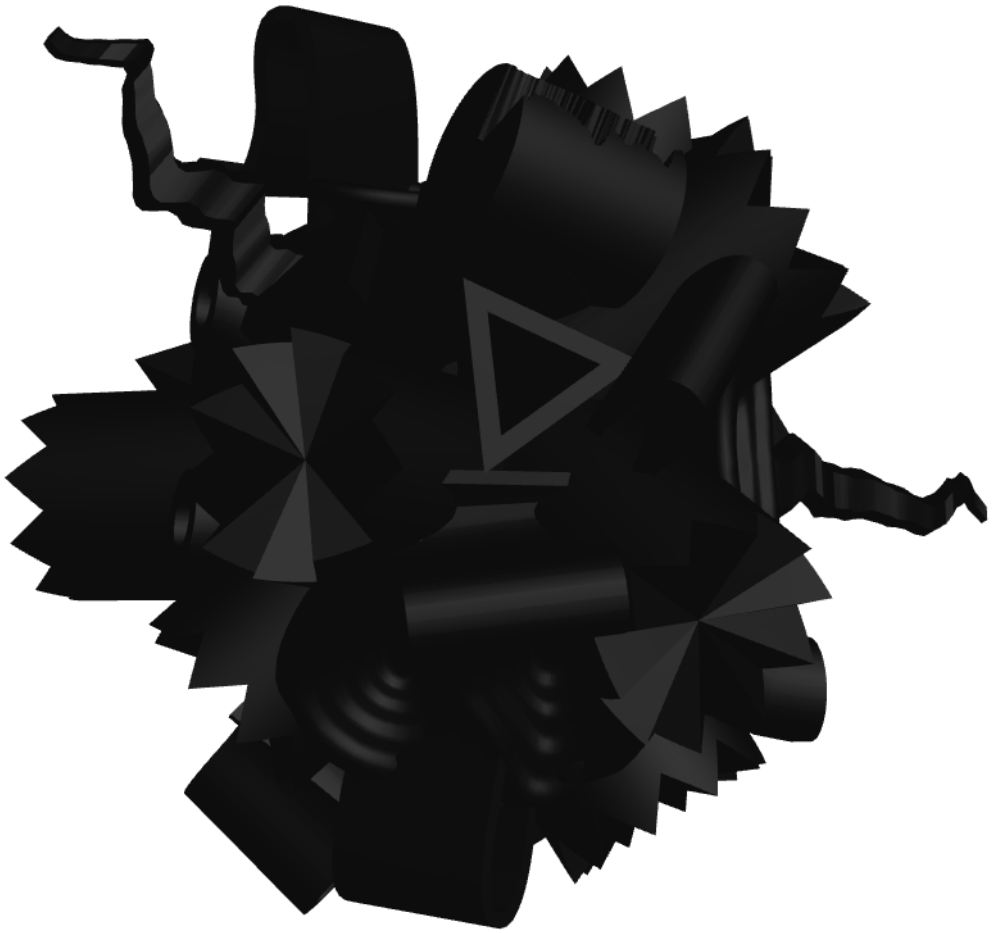
Further research into this field could yield a bright future of an open-source space where anyone can put nearly anything into orbit (or instead of producing more space trash we could turn space-junk collection into a game and then use the found parts for a more macroscopic project). It’s fun to talk about a swarm of picosatellites disabling a spy satellite, but perhaps the more radical approach would involve crowdsourcing an effort for space-based renewable energy generation, or massive reflective objects to slow or even reverse the effects of anthropogenic global climate change. By vastly reducing the cost and difficulty to enter into such a normally cost- and experience-prohibitive field, we can open up a much higher percentage of the world’s thinkers to a shot at space research and/or travel.

Amy Ireland	Bouequet, Stealth Poetry Module 02	2016
Author	Project	Year

#device	#sense	#remesh
Format	Theme	Action

Synaesthetic poems created via transcoding

BOUEQUET, STEALTH POETRY MODULE 02



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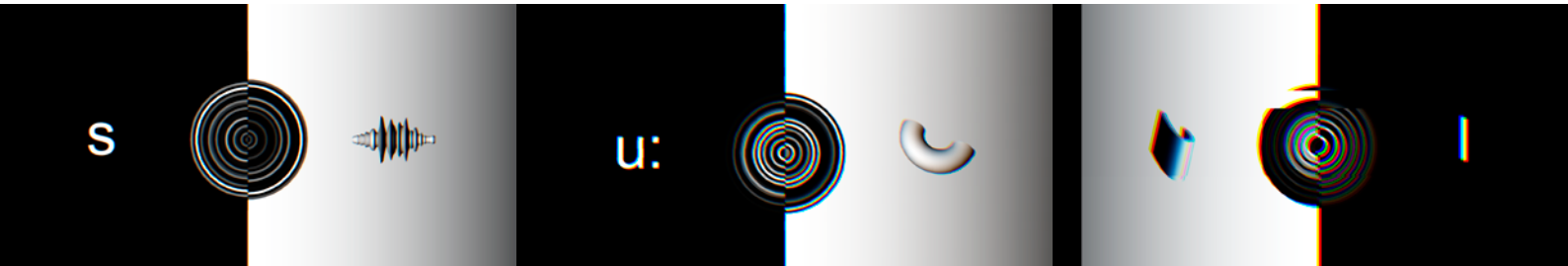
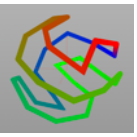




Bouequet is an experimental work-in-progress comprising a series of short synaesthetic poems created via trans-coding. The final form taken by each text is a spherical 3D printable object with roughly the same dimensions as a rose. The poem's material form functions as camouflage under which the work can be smuggled into domestic and corporate spaces simply by exploiting the desirable vacuity of a decorative 'objet d'art'. The composition of each poem (in its original text form) is guided by a meditation on processes of encryption and abstraction, usually written in response to an existing philosophical text concerning the relationship between language and flowers – floriography being a traditional, transcultural model for divine communication (Stéphane Mallarm's 'Crise de vers' and Georges Bataille's 'The Language of Flowers', for example, count among previous stimuli). The cipher for the 3D phonetic alphabet can be found for Desktop and Mobile.

Process
Each module is produced through a process of encryption devised to guide language back to matter and designed to cycle around a central homophonic ambiguity particular to each one. The original text is first transposed phonetically, effectively transforming it into a sonic event and consolidating the work's tendency towards homophonic equivocation. This activates the latent potential of the trans-word homophony integral to each composition, making it possible to read the poem as a single sound, or a concatenation of sounds, and enabling new words to be formed by, for example, connecting the final phoneme(s) of one word to the opening phoneme(s) of the following word. Along with rendering the homophones entirely ambiguous, this is what allows for multitudinous readings of the initial text. Each phoneme has then been paired with a three-dimensional shape designed to express its sonic and connotative properties and is then modelled in three dimensions using CAD software. The shapes are strung together in an order that correlates with the phonic representation of each text in an infinite line along the surface of a sphere. The poem is then 'tightened up', collapsing the materially rendered phonemes inwards so that the assemblage is almost solid and the resulting object is printed in three dimensions, informed by the scale of a flower. The resulting object can be 'read' in multiple ways – haptically, visually, sonically, etc. It is possible to decipher the original text (or one of its parsings) heuristically, moving through different phonic combinations until you have exhumed a word or string of words. However, it is impossible to determine which version is the 'authentic' version, for the origin has been excised. Of course, it is equally desirable to ignore the poetic line altogether and read across the object, or chose discrete phonemes stochastically. The permutational possibilities are quite large, and even greater if the reader is willing to discard any fidelity to sense. Readers are encouraged to explore the full spectrum of possibilities afforded by the poems for heterodox forms of reading and transmission. Their fist-sized dimensionality makes them amenable to use as carriers of cryptic messages in some form of future warfare, perhaps printed in a dense metal and hurled through windows, fired at drones, etc.

As an ongoing work, _Bouequet_ speculates on ways in which poetry might be transmitted after the death of the book. Additive manufacturing processes, like the technology that made the newspaper possible, allow for mass distribution, yet, unlike the newspaper, they are not centralized and (for the moment) retain their open-source ethos. These poems are all freely available and anyone can download them, modify them, and reprint them for themselves.

Concept
Language is a method of encryption that translates its outside, however one chooses to construe it, into a coded, symbolic inside. Both divine and logical languages, designating as their grail a faultless correlation between these two realms, necessarily underwrite their code systems with either divine guarantee or rational precision. It could be said that poetry capitalizes on the failure of these systems, while simultaneously mourning their loss. This is the resurgent dilemma of twentieth century poetics. The twenty-first century retains the basic form of this dilemma yet its anxieties are intensified, for its poets are squarely faced with the problem of what language may become in the wake of the death of _both_ God and the human subject as we conceive of it today. If language is code, might it not run wild once the last tethers of human exigency are cut? Language as mad, self-propagating, non-linear putrescence... a growth that crowds out every last hope of logical correlation, dissolving the clarity of things in a ubiquitous mesh, infinitely egged on by its own feedback.

Bouequet proffers a Language of Flowers for the linguistic apocalypse in which missive becomes missile: if it can't be read, then it might at least be hurled Who or what by, remains to be seen.

THE DOMESTICATION OF PLASTIC

"3D PRINTING REPRESENTS THE DUALITY OF INDIVIDUAL DESIRE AND INFINITE REPRODUCIBILITY. IT IS OIL MADE DIGITAL, MADE PERSONAL."

The recent extension into consumer markets of 3D printing frees plastic production from the confines of industrial manufacture. Despite the fact that plastic was and continues to be produced by relatively small scale plants, often with about one hundred employees, these spaces were necessarily industrial. Plastic objects were used within but could not be produced from domestic and craft spheres. This led to what Mike Michael called plastic's 'abject relationality.' He writes, '…plastic is perhaps the example par excellence of what, from the perspective of the domestic and of craft, is an abject relationality – the impoverished possibilities of re-inventing and re-informing plastic. In sum, plastic is a material with a 'composition' (where 'composition', read through a Whiteheadian lens, implies a nexus of technologies, systems, skills, environments and so on) and precludes manipulation outside of an industrial setting' (2014, 32). Plastic objects, Michael argues, imply an entire production chain, from oil and natural gas extraction to chemical plants to extrusion and molding processing to container ships and distribution centers, finally arriving on shelves in stores.

3D printing, by short-circuiting this composition and in the creation of new compositions that are implicated with hacker and art cultures, extends and amplifies plastic's contradictions.[1] At once a material of utopia and anxiety, of abundance and waste, of democratic access and ecological horror, plastic can be understood as the material distillation of advanced capitalism. It gives rise to the pleasures and desires of an increasingly large section of the population, resulting in the most fabulous and imaginative sex toys, prosthetics, a wide array of guns, artist projects, replicas of lost cultural monuments and statues, and all of the banal and endlessly reproducible objects that increasingly populate our everyday lives and can be found discarded and broken in every location on earth. 3D printing represents the duality of individual desire and infinite reproducibility. It is oil made digital, made personal.

What is particularly fascinating about this moment in time for 3D printing is the fact that the quality, at least for most consumer 3D printers, isn't very good. It breaks and cracks, the programs are full of glitches and holes and the objects end up with too much and not enough plastic. Detail is lost. The hand of the machine is visible in the work, along with seams used to bind pieces together. Similar to the poor quality image, 3D printing 'mocks the promises of digital technology…Only digital technology could produce such a dilapidated image in the first place' (Steyerl 2009, 1). And like poor images, 3D printing 'feeds into both capitalist media assembly lines and alternative audiovisual economies' (Steyerl 2009, 8). The technologies become vectors for liberation from industrial processes just as we are ever more locked into and increasingly accept the intimacies of oil, solidified through plastic.

Duane Linklater's recent work for the *salt 11* exhibition at the Utah Museum of Fine Arts (UMFA) uses the imperfect, glitchy, nascent technologies of domestic 3D printing to exploit the ways in which the objects produced erase details, blur edges, and create rather unappealing beige blobs. The project involved 3D printing objects, that didn't have an attributed author, from the Utah Museum of Fine Arts' American Indian collection. The composition of the works was done through digital files, transmitted over 2,000 miles and printed using consumer quality printers. What results are degraded, washed out, and blurry renderings of objects that were once practical, ornamental, ritualistic, spiritual, or artistic. The artworks comment provocatively on the violence of the de-contextualization of colonial acquisition of Indigenous objects. The blurred and washed out sculptures that resulted, replete with 'mistakes' such as bumps and divets and the purposeful preservation of the seams that show how the works were pieced together, is a comment on the blatant disregard for the specificity of Indigenous art and Indigenous objects. In fact, during the course of the research, it was discovered that one of the objects that had had no noted authorship, did in fact have the artist's name etched into it (Tassie 2015, 9). Due to this observation, the artist's name was finally entered into the official records of the museum. The blatant erasure or denial of authorship (a value that is held by Western museums generally) mirrors the lack of care in acquiring the objects, the lack of specificity or thoughtfulness when noting tribal names, contexts that the object circulated in, and, most importantly, gaining permission through reciprocal processes of approval to collect the object in the first place. Linklater's artworks appear like the zombie-doubles of the original artifacts, without a soul or a life, commenting on the ways in which the UMFA holdings are composed of these diminished relics. The artworks then provide a cutting critique and lively engagement with contemporary art and the continued resurgence of Indigenous cultures across North America. As Rosa Menkman writes in relation to glitch art, 'Through these voids, artists and spectators

1 I realize that 3D printing can be done with a range of materials, from bioplastics to clay to various types of resins. What I am primarily concerned with here, though, is the implication of oil in the manufacture and creation of hacker and artistic cultures through the material of plastic.

can understand the politics behind the code and voice a critique of digital media' (2010, 4). Linklater's works can be understood within this framework of the glitch, introducing an aberrant space that allows for critical reflection and commentary on the colonial structures of museums. Further, the possibility of replication of the 3D rendering coupled with the consumer quality status of the objects themselves undermines the museum's quest for an 'authentic' Indigenousness that is rather the fabrication of a colonial imaginary.

In addition to the possibilities for engagement and critique by artists, the repurposing and hacking of the systems of 3D printing provide ways for plastics to be domestically recycled – a moment that seems to herald in a future when we, as a culture, will acknowledge the incredible value of this material of compressed time. 3D printing offers the possibility of recomposition of the intimacies of oil. But these processes of violent extraction do not go away and in the endless proliferation and replication of objects in our everyday lives, the space of critique is often not so far away from complicity. It is negotiating the immanence of oil to provide glitches, cracks, and imperfect renderings that new imaginaries of plastic unfold.

Works Cited

Menkman, Rosa. 'Glitch Studies Manifesto' 2010.

Michael, Mike. 'Process and plasticity: Printing, prototyping and the prospects of plastic' in *Accumulation: The Material Politics of Plastic*, edited by Jennifer Gabrys, Gay Hawkins and Mike Michael, 30-46. London: Routledge, 2014.

Steyerl, Hito. 'In Defense of the Poor Image' *e-flux* 10 (№vember 2009)

Whitney Tassie. 'Salt 11: Duane Linklater' Utah Museum of Fine Arts, 2015.

Kanyaphorn Kaewprasert and Kornkamon Kaewprasert with Gaia Scagnetti (contributor)
Author

Desire Grammar Totem
Project

2014
Year

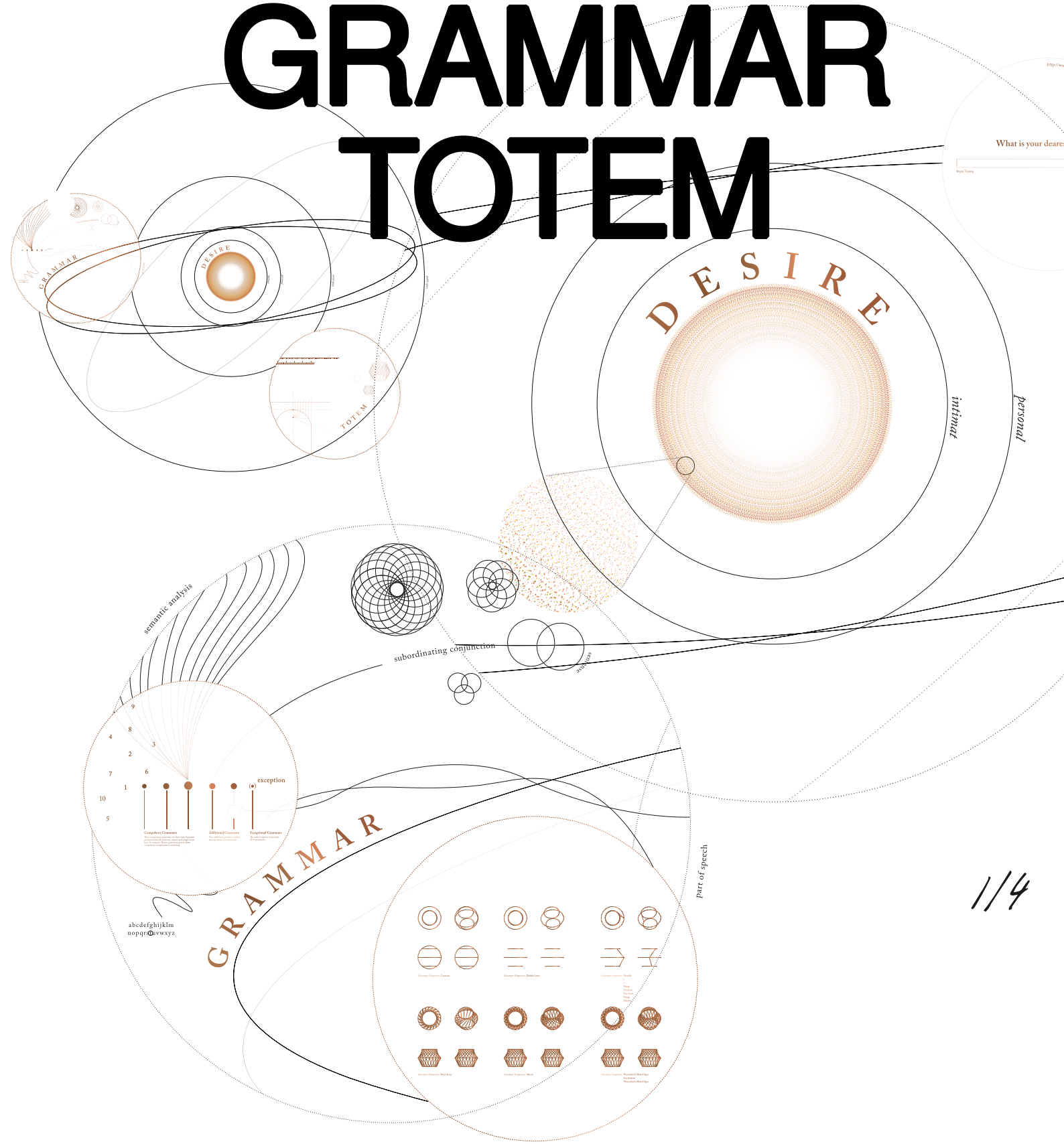
#recipe
Format

#play
Theme

#morph
Action

A visualising machine that reifies your desire into a totem

DESIRE GRAMMAR TOTEM



1/4

We believe in desire as a fluid, multiple and dynamic force, something positive and productive. As a force, desire renders worlds of transformation, destruction and construction. Desire dictates priorities; priorities shape choices; choices determine actions. Desire returns the most powerful of the intentions. It extends beyond the individual and it is in action always: there is no life without desire, there is no quiet moment for the desiring mind.

Desire is a function of the properties we attribute to objects; those attributions actually evolve. The designation of value to objects (and the social exchange of it) stimulates desire. This project, *Desire Grammar Totem*, discusses undervalued and tacit desires.

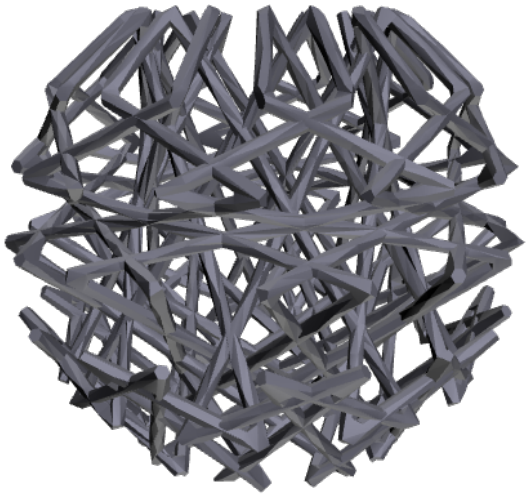
Once an individual desire is expressed and communicated into the system, the message needs to be encoded and reified. A body of rules, a Grammar, was set as a translator. The Grammar transforms words into forms. This grammar is not concerned with meaning but with the formal expression of the desire. The system performs semantic analysis, sentiment analysis, key words detections and a series of numerical operations on the input. It uses the results of this analysis to generate a three-dimensional model. This form is only meaningful to its author, for everybody else it is a mere abstract object.

In the third part of the project we use additive technology to generate a *Totem*; a three-dimensional printed visualisation of your desire. *Totem* demonstrates how human belief can be transposed into a tangible form. The belief in the inherent power of a Totem requires a new understanding of our cultural connotations of 3D printed objects: not an unfinished and temporary prototype, but a quasi-religious representation of our inner self. In this project, additive technology not only makes an invisible desire visible but also tangible. *Desire Grammar Totem* underlines the contrast between the sacredness of totems and the secularity of additive technology. The Totem is framed in a glass bell jar; it functions as a memento to our belief that desires can come true.

Technical Description

The question we asked our users was *What is your dearest desire?* An unlimited character input text field constitutes the first interaction with the system interface.

To inform the design of *Desire Grammar Totem*, we conducted a qualitative analysis of more than a hundred users generated answers to this question. The study aimed to explore the answers' variations in order to create a functional *Grammar*. The Grammar defines the rules translating users' answers in three-dimensional forms.



The research provided very useful insights. It indicated that linguistic sentence structures cannot be described by interpreting single words as almost half of the given answers were multi-clause sentences. Contributors responses varied in length and complexity. Many users expressed desires that went beyond self-concern; many addressed their relationship with others or sensitive social issues. Positive feelings were expressed using significantly different text structures than negative ones.

The conceptual form of a Sphere – as symbolic representation of the *Ensof*, the origin – was used as a leading metaphor to represent a user answer in three-dimensional forms. The perfection of the sphere has been regarded as a symbol of Wisdom without beginning or ending; just being.

If your answer to the question *What is your dearest desire?* is wisdom, your Totem is a sphere.

The body of Grammar has six rules working dialectically on data analysis written in PHP and three-dimensional models in Grasshopper, Rhinoceros. The six Grammars, consist of three compulsory, two addition, one exception, are designated to extract values.

Grammar i; the number of facets shaping the initial sphere are decided by word count. The amount will be mathematically based on 6 range. If the value is between 1 and 6 then it is converted to a decimal fraction.

If there are 0-6 words, divide by 1.
If there are 7-12 words, divide by 2.
If there are 13-18 words, divide by 3.
If there are 19-24 words, divide by 4.
If there are 25-30 words, divide by 5.
If there are 31-36 words, divide by 6.
If there are 37-42 words, divide by 7.
If there are 43-48 words, divide by 8.
If there are 49-54 words, divide by 9.
If there are 55-60 words divide by 10.

If the answer is;
1 then convert to decimal 1.73959.
2 then convert to decimal 2.98125.
3 then convert to decimal 2.45399.
4 then convert to decimal 1.316126.
5 then convert to decimal 0.86334.
6 then convert to decimal 0.61461.

Grammar ii, the divisions of the facets are decided by English alphabetical order of the first letter of the last word. The research sample study showed the presence of a common pattern: in a simple sentence structure the answer (your dearest desire) is often expressed in the last word. Other patterns were identified: in sentences starting with a first person pronoun, this is often followed by a verb expressing desire [want, hope, desire, crave, etc] and lastly by a desired object noun. In clauses starting with verbs, objects noun are stated last. In one word answers, the words themselves are desired objects.

Grammar iii (a), Numbers of the chosen words are rigidly related to decimal fraction values of Grammar i.

If Grammar i is valued as;
1.73959 then convert to integer 3.
2.98125 then convert to integer 3.
2.45399 then convert to integer 3.
1.36126 then convert to integer 4.
0.86334 then convert to integer 5.
0.61461 then convert to integer 6.

x coordinates are related to the order in linguistic structure starting the first order from 0. Variable of value is between 0 to 5

Grammar iii (b), y coordinates portray symbolic meaning to form. Sentiment analysis labelling defines positive or neutral as convex forms, negative as concave forms.

If positive or neutral is labeled;

Count how many letters of the chosen words sequentially. The given value will be mathematically mode with number of divisions or the answer from Grammar ii.

If negative is labeled;

Count how many letters of the chosen words sequentially then add half amount of division numbers to the value. The given value will be mathematically mode with number of divisions or the answer from Grammar ii.
Then, connect the x-y coordinates together sequentially.

Grammar iv, Additional grammar for well regarded explanation of desire. Detected subordinative conjunctions adds another layer of complexity to the form by rearranging sequence of x-y coordinates connection.

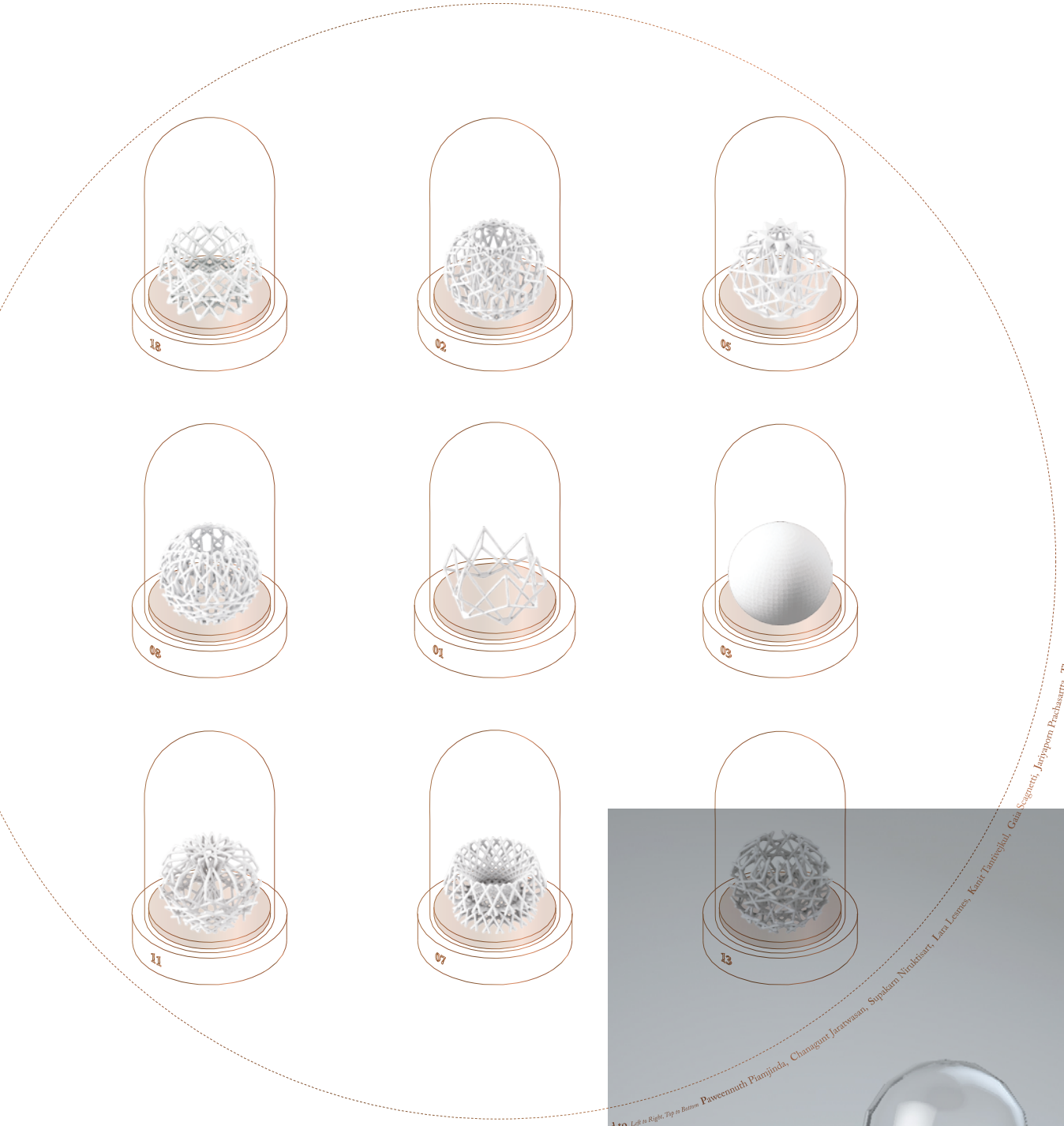
If subordinative conjunction(s) is/are detected;

Count how many of the conjunctions then to be mathematically mode with numbers of contours or the answer of Grammar i before converted to decimal fraction. The value indicates the sequence order that will be queued two order behind.

Grammar v, Desire for others conveys intentions. Originator will be given a special treat; special material. Detecting the preposition ‘For’ accompanied by Noun(s) or Pronoun identified by WordNet lexical semantics resource.

Grammar vi, The only exceptional grammar hacked its own rules of all stated Grammars by replacing symbolic meaning. If the word Wisdom is detected, create a perfect sphere.

Through a translation process, desire is encoded into values. The values to be filled in variables are in a given file to progress via Grasshopper, Rhinoceros. A Totem is originated from sixty millimetre diameter in x axis sphere. Variable of facets and divisions of curved components are dictated by encoded values. Basic forms and structures were assigned. The finishing process refines the surface combining all joints by plug-in Weaverbird’ mesh edges and Exoskeleton. When the calculation is finished, virtual representations of totems will be automatically uploaded to Sketchfab under account desiregrammartotem. And again the visualisations are uploaded back to an embedded platform on interface. Three-dimensional printing is the final process of objectification. The printed Totem is encapsulated in a glass bell jar with a white marble base and copper plate internal surface. Each object has a unique identification number printed on every marble base.



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The totems were attributed to Left to Right Top to Bottom Paweennuth Piamjinda, Chanagunt Jaratwasan,Supakarn Niruktisart, Lara Lesmes, Kanit Tantivejkul, Gaia Scagnetti, Jariyaporn Prachasartta, Thanath Santati, Fredrik Hellberg

ARTEKLAB	USOA 1.0 (Ultimate Software Open Animal)	2015
Author	Project	Year

#device	#postnature	#morph
Format	Theme	Action

USOA updates the function of pigeons as messengers through an exostructure with information transmitting possibilities (cyborg pigeon?)

USOA 1.0 (ULTIMATE SOFTWARE OPEN ANIMAL)

A few days after an #additivism workshop, held at ARTKELAB, San Sebastian in Summer 2015, we heard some extraordinary news. A pigeon had been arrested by the Indian authorities accused of espionage. On its wings a message in Urdu had been written as well as a serial number. This story did not have a further chapter, but it intrigued us that someone found in these birds a way to send a message, however incidental or humorous it may have been.

We had unconsciously done the same thing with our USOA project. With no clear purpose we had decided to 'use' this animal part of our society – so integrated within it (probably even better than humans) – to extend or start a new relationship. Its main features are an incomparable sense of orientation and a full proof fidelity towards its home. Not bad.

This interest in pigeons as a mobile resource, in our drone-obsessed generation, is not incidental. The history of autonomous communication by pigeon is far from anecdotal. Let´s make a short review of its history then.

The first pigeon we designed as a communicating object received, after several iterations, an Olive tree branch from the mainland that let him know his sailing journey was over. This first messenger is now the icon for universal peace and love.

The Egyptians, Darwin says, used pigeons five thousand years ago to communicate between their cities and send messengers from the ships as they approached the harbor. Genghis Khan led his fleet with these birds too. Ancient Greeks used them as well in Belic conflicts and to announce the result of the Olympic games. Since then pigeons have been a silenced but functional resource in autonomous communication.

Legend has it that in 1815 Nathan Rothschild used one of these amazing birds to transmit the result of the Waterloo battle. The information was received ahead of other traders, consequently ensuring massive stock investments were made which secured the House of Rothschild's fortune.

In subsequent wars these bird messengers were targeted by trained hawks and specialized snipers, or kidnapped to confuse the enemy with fake messages. The Soviet invasion of Afghanistan was itself announced by carrier pigeon. In peaceful times they have been used to send medicines and blood samples, or even to deliver semen to fertilize cattle in difficult to access regions.

We must admit that the more we learnt about the carrier pigeon, the more fascinated we became.

This was the foundation of our interest when we created USOA. A priori vision of using living beings as a helper, an animated resource, was enough. With the USOA project, we pose the question: are we upgrading the pigeon by dressing it up, protecting it, and giving it an exostructure? If it is cruel then so is human life. Is making animals reliant on the human environment always cruel? This is a question that only the pigeons can answer.

Giving a function to some thing – some creature – automatically stands for giving it a responsibility and, perhaps, a value. We understand liberty as the joy experienced by a biological life in Paradise before we covered ourselves with a fig tree leave. We do not think of USOA as being a gift for the pigeon. Neither is it merely a mission statement, a defensive element or a life sentence. USOA is neither a completely positive or negative element for the pigeon species. Welcome to the human system.

Tom Burtonwood Author	Global Reconstruction of Artifacts and Bygones (G.R.A.B.) Project	2016 Year

#fabulation
Format

#futures
Theme

#collide
Action

A state level multinational organization tasked with capturing three-dimensional digital copies of the world's cultural artifacts and bygones

GLOBAL RECONSTRUCTION OF ARTIFACTS AND BYGONES (G.R.A.B.)

1/5

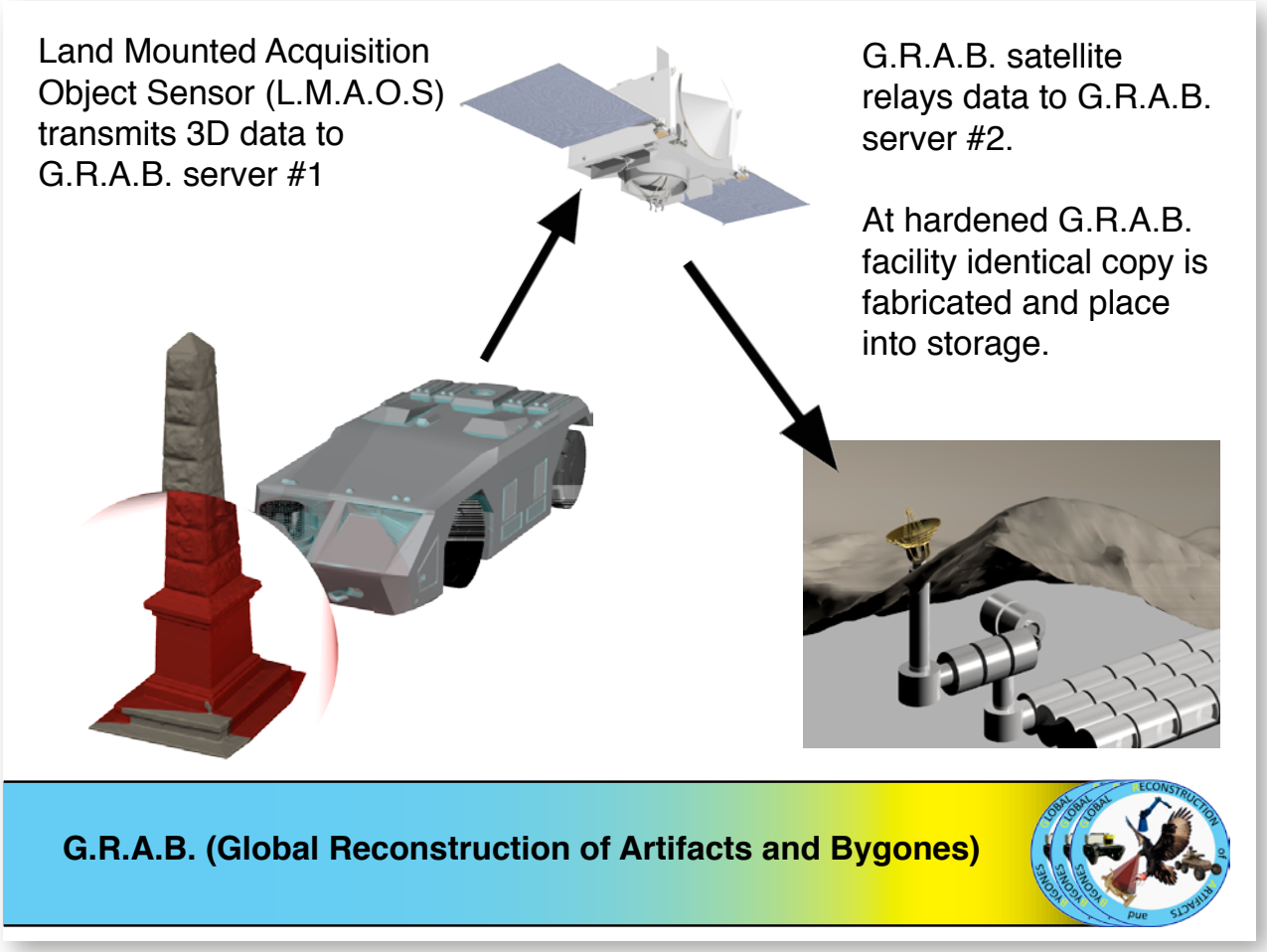
Although purportedly altruistic in character the true identity and purpose of the multinational entity Global Reconstruction of Artifacts and Bygones (G.R.A.B.) is not entirely clear. Established in 2016 G.R.A.B. is a state level multinational organization tasked with capturing three-dimensional digital copies of the world's cultural artifacts and bygones. G.R.A.B. sprang onto the world stage in the early stages of the twenty-first century in response to the growing unease at heritage sites being destroyed by war and environmental disaster.

Brushing off criticism of cultural colonialism and intellectual property theft G.R.A.B. quickly embarked on a global campaign to identify and locate canonical pieces of sculpture and architecture. Equipped with their hit list of must have items G.R.A.B dispatched its agents around the world to 3D scan and digitally capture these artifacts and bygones. Working in partnership with the armed forces of the world's super powers G.R.A.B was able to embed its scanning equipment on a range of platforms from battle tanks, to drone and even infantry patrols. In this manner G.R.A.B. was able to record the capture important cultural works in some case moments before their destruction.

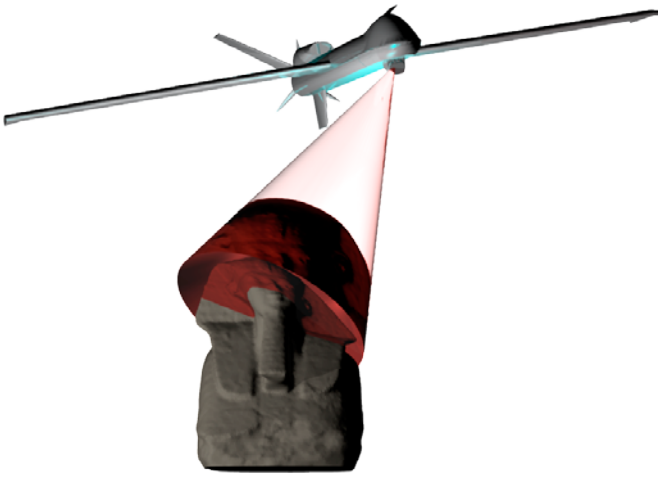
Once captured G.R.A.B. agents transmit the three-dimensional data directly both to facilities in secure locations around the world and onward to orbital fabrication platforms. As this leaked slide presentation shows, G.R.A.B is purportedly backing up cultural treasures from around the world in a hedge against catastrophe, but for whose benefit this is being undertaken is not entirely clear. The hardened facilities illustrated in the slides are far from urban centers and the artifacts archived there are inaccessible at best. The orbital and space based platforms are even further removed from the general populace.

While the efforts of G.R.A.B. to preserve heritage are to be commended the cost and resources deployed in this endeavor could surely be put to better use, staving off the delinquent effects of climate change for example or ameliorating the encroaching trauma might be a good place to start.

2/5



Unmanned Aerial Vehicle Mounted Acquisition Object Sensor (U.A.V.M.A.O.S.) captures artifact.

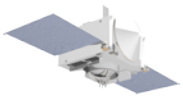


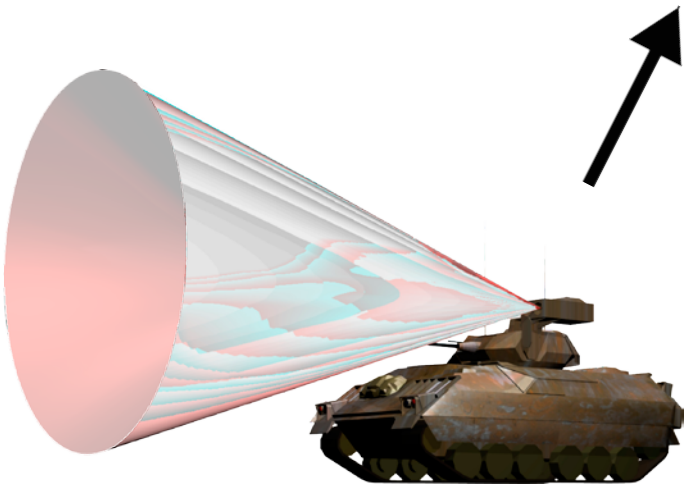
Data of captured artifact is fabricated at secure G.R.A.B. facility

G.R.A.B. (Global Reconstruction of Artifacts and Bygones)

3/5

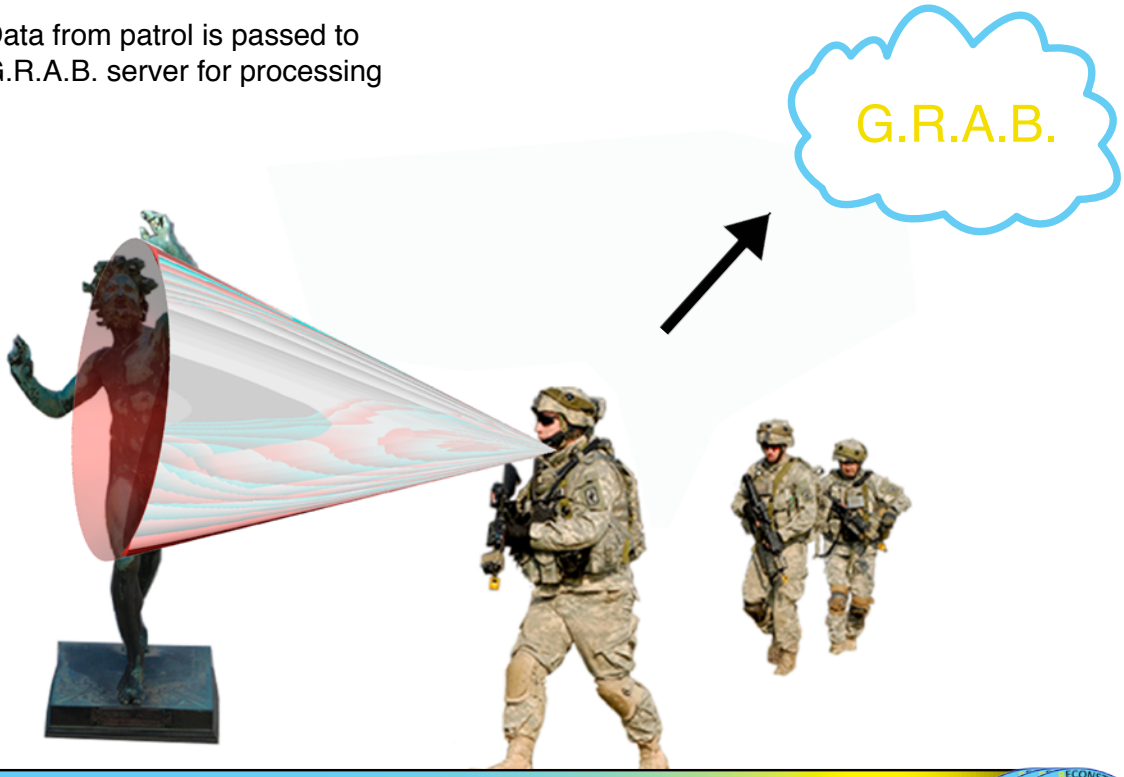
G.R.A.B. Land Vehicle Mounted Acquisition System (L.V.M.A.S.) enables convenient 3D data capture during normal combat operations.





G.R.A.B. (Global Reconstruction of Artifacts and Bygones)

Data from patrol is passed to G.R.A.B. server for processing

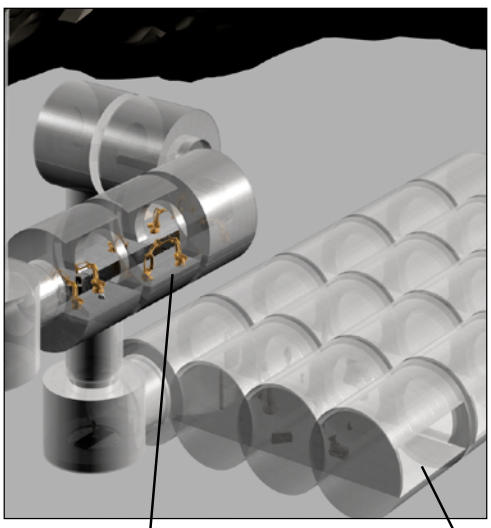


G.R.A.B. (Global Reconstruction of Artifacts and Bygones)

4/5

Data from G.R.A.B. cloud is passed to fabrication robots at a G.R.A.B. facility for reconstruction.

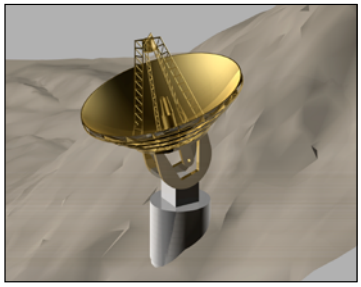
Copied artifacts are placed into storage.



G.R.A.B. Storage Farm

G.R.A.B. Fabrication Robots

G.R.A.B. (Global Reconstruction of Artifacts and Bygones)

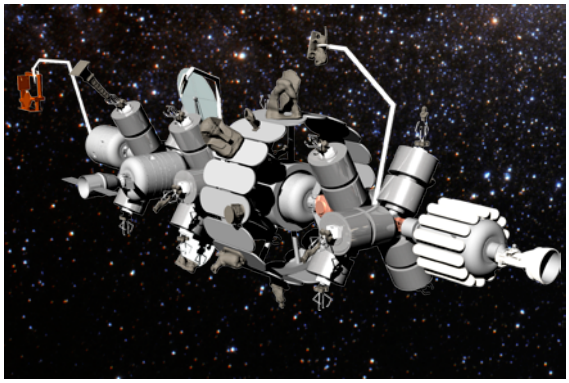


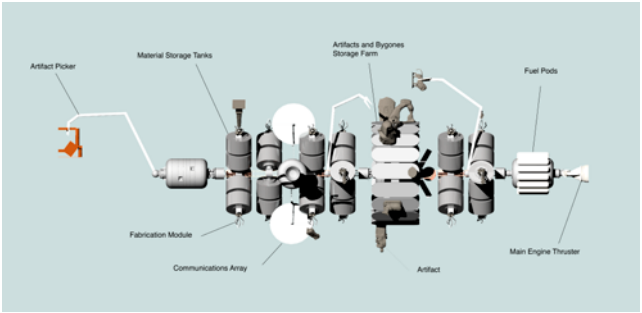
G.R.A.B. (Global Reconstruction of Artifacts and Bygones)

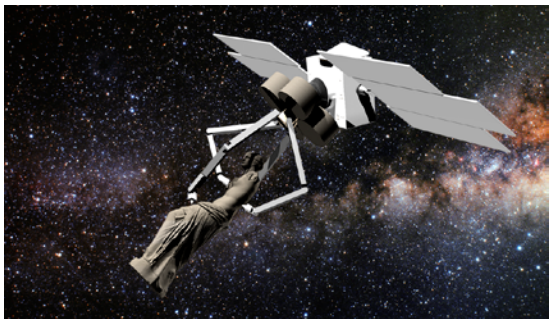
5/5

In preparation for planetary catastrophe and / or extinction level events G.R.A.B. will backup Artifacts and Bygones on both orbital and lunar platforms.

Selected artifacts will be sent into space as emissaries of humanity.







G.R.A.B. (Global Reconstruction of Artifacts and Bygones)

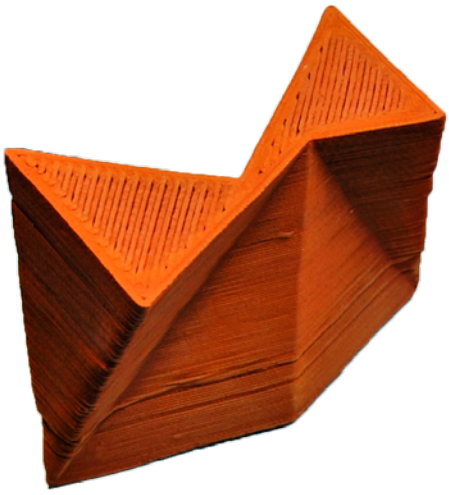
#recipe
Format

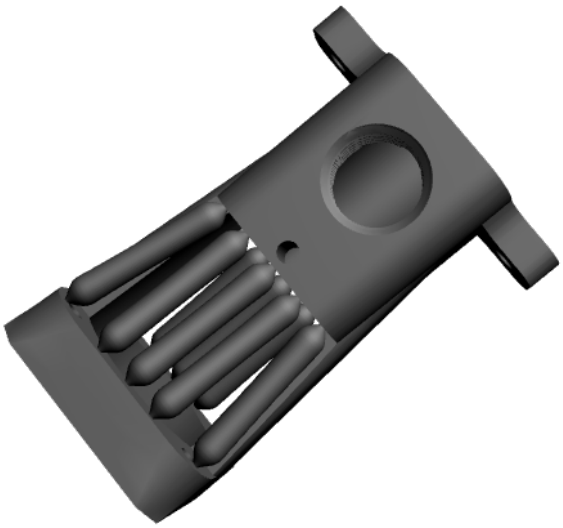
#matter
Theme

#extrude
Action

Open-source clay extruding print head that can be used on numerous 3D printers

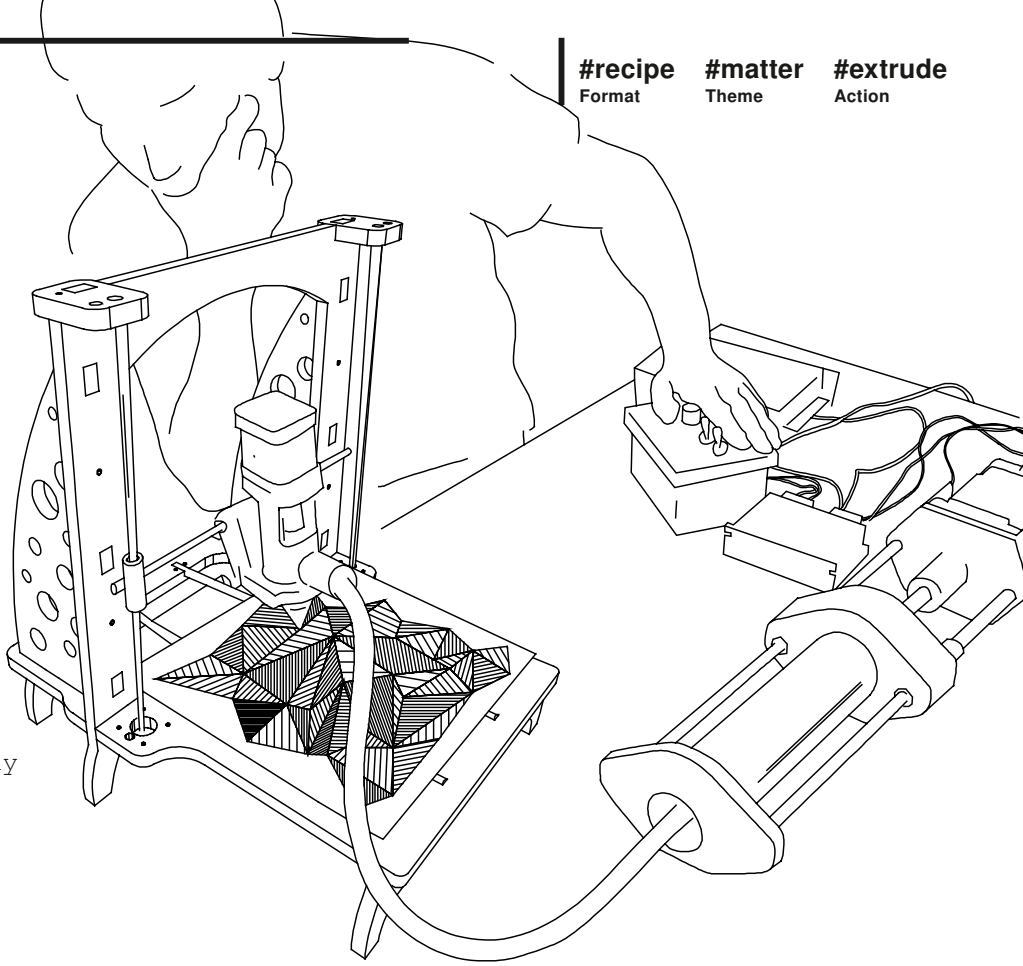
OPEN SOURCE CLAY PRINTING





This is an open-source clay extruding print head that can be used on numerous 3D printers. I'll add a proper how-to soon, and a video or two. It is a work in progress. It is based on pioneering work by Unfold, Jonathan Keep, the Wasp Group, and more. The project was initiated by Tom Lauerman at Penn State University, School of Visual Arts and is being developed in collaboration with Engineering Students as part of the University's Learning Factory program. The work is supported, in part, by Penn State's Center for Innovative Material Processing through Direct Digital Deposition (CIMP-3D).

This is only the print head portion of the design. A clay 'feed' system is in active development and will follow. For a complete parts list check the 'Bill Of Materials' section. The print head costs about $30 USD to build (excluding printed parts). A video of the system working can be found here.



All the parts needed to build this open source clay extruder:

1. Printed extruder.

2. Printed base.

3. Nema 17 stepper motor
   (I purchased mine from Lulzbot: $13.95).

4. Aluminum coupler – 5mm on both ends. (I purchased mine from Inventables: $6.95).

5. 1/2’ Flat faucet washer. I purchased a pack of 10 at Home Depot for $1.69, (the outside dimension of this rubber washer is 3/4’, the inside diameter is 1/8’. It is 1/8’ thick. (Why is this called a 1/2’ washer?)).

6. Deck Screw 1/4’ x 4’. I bought mine at a local Ace Hardware for $1.60. I used a ‘Timber-Tite’ brand – here’s a pack of 50 at Amazon. I’d imagine any similar screw would work, perhaps better.

7. Cake decorating tips. This is the ‘nozzle’ of the print head. There are numerous shapes and sizes available, all of which could work potentially. Two brands which fit this extruder are Ateco and PME. The Ateco ones are about $1 each, the PME are about $6 each. Cake decorating Pros rave about the more expensive PME tips.

8. 3/8’ x 3/8’ push fit male adapter. I got mine at Lowe’s for $3.49. The same one is on Amazon.

9. (4) M3 x 14mm Socket Cap Screws. Approx. $0.15 at any hardware store.

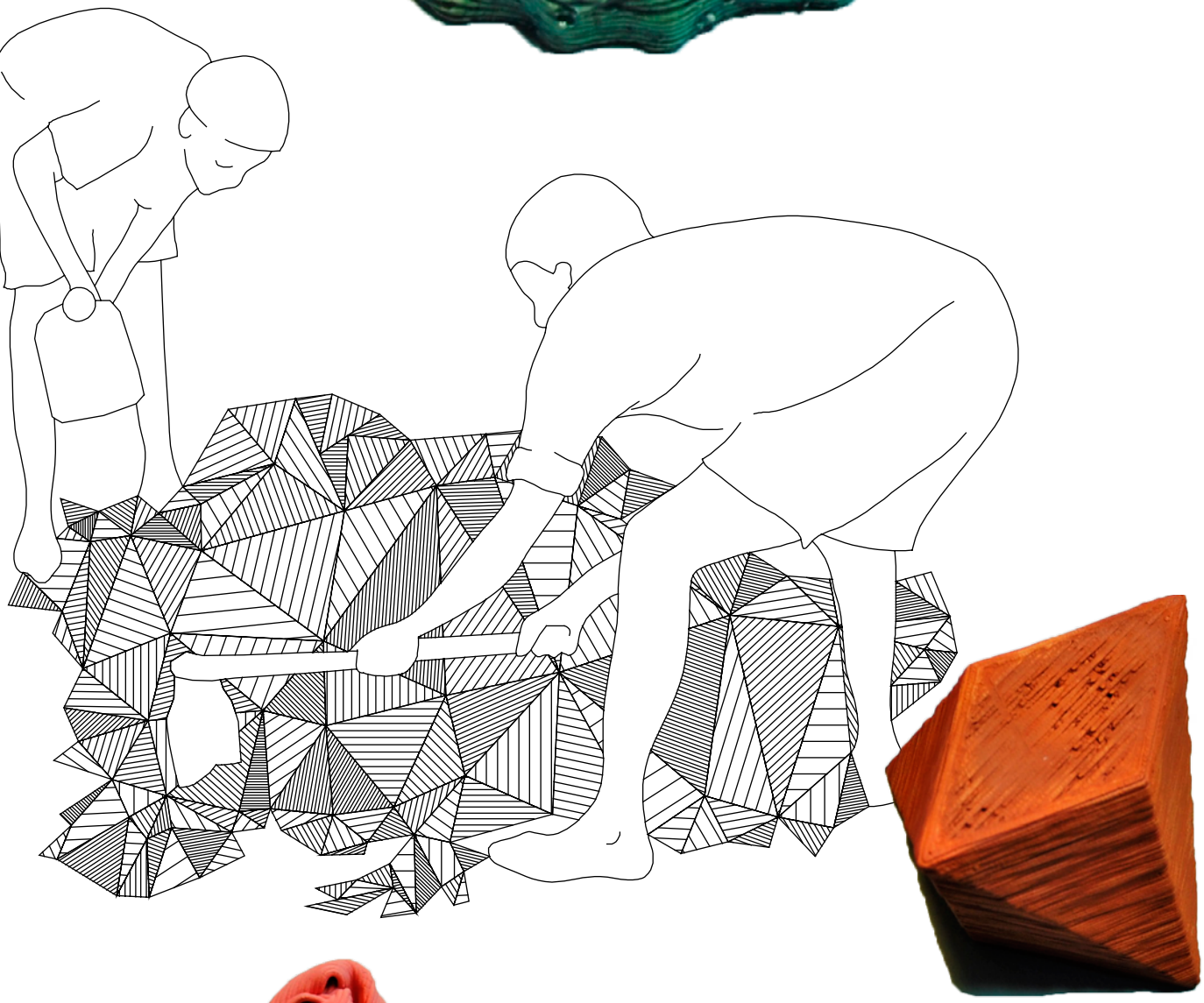
10. (2) M4 x 20mm Socket Cap Screws. Approx. $0.15 at any hardware store.

11. (2) M4 Wing Nuts. Approx. $0.75 at any hardware store.

12. (Totally optional) plastic thumb screw heads M3 & M4. These make it easy to remove screws without a wrench. I purchased these at McMaster Carr.

13. (Totally optional) 4 pin JST connectors. I solder these onto my motor wires to make attaching and detaching the extruder motor really simple. I switch between plastic and clay printing frequently and am always swapping print heads. I bought these on Amazon.

Total Cost: $29.58 (excluding printed parts)



Léo Sexer
Author

Raflesia
Project

2015
Year

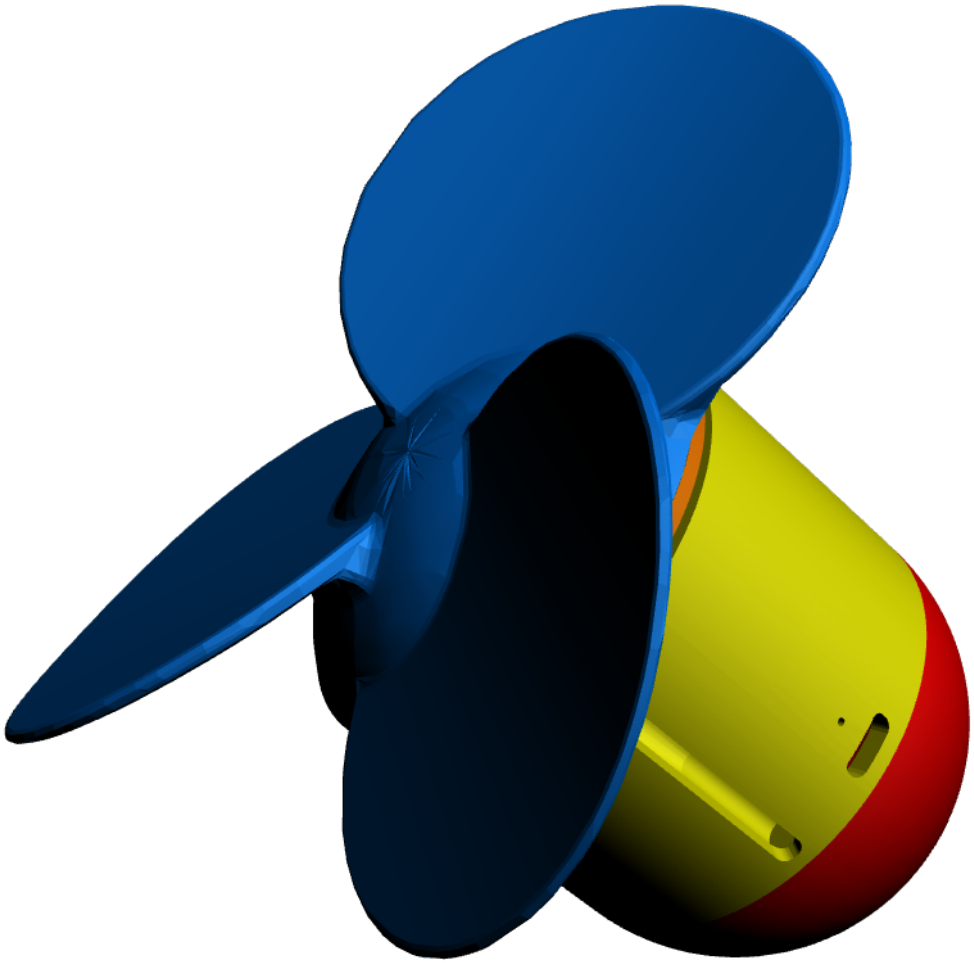
#device
Format

#resistance
Theme

#collide
Action

Parasitic wind turbine

RAFLESIA

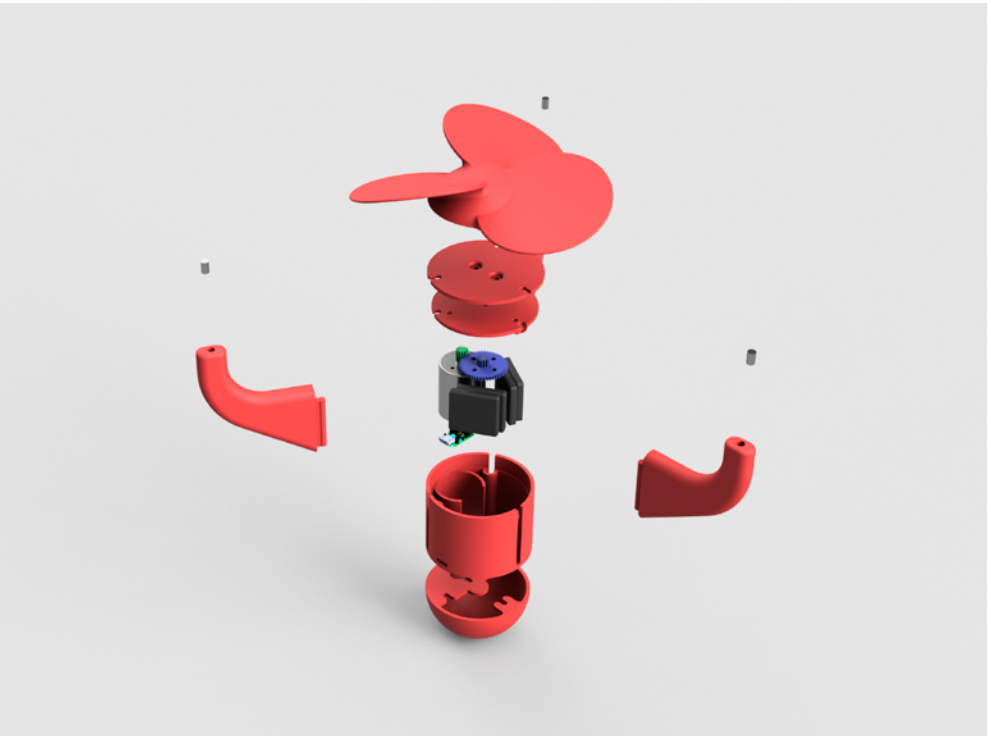


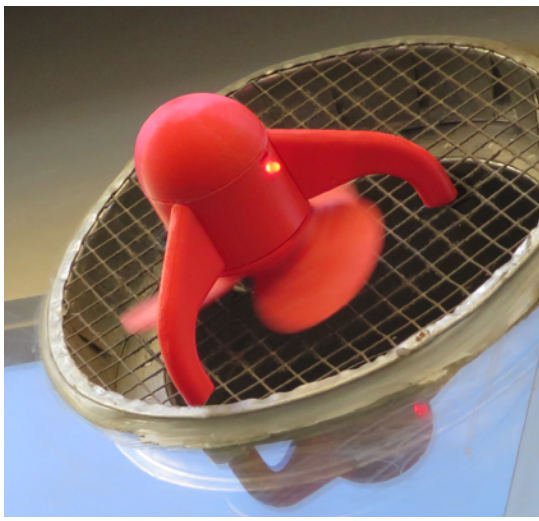
Raflesia
Project

#device
Format

#resistance
Theme

#collide
Action





Raflesia is a parasitic wind turbine. It attaches to air sources within the city with its three magnetic legs. The turbine gathers the excess wind through a system of gears and motors, collecting enough energy to power small electronic devices. Most of the parts can be 3D printed by everyone, and the rest, such as the electronic parts, can easily be purchased online. The object had to be as simple as possible; simple yet very powerful. Electricity is a valuable resource, and as every resource it can be an object of greed. In a world where energy is becoming more and more valuable Raflesia could become a very useful tool. By parasitizing energy consuming devices such as air conditioners energy becomes a fluid, neither raw input nor waste output. Raflesia was influenced by Michael Rakowitz's paraSITE project, which used air conditioning system to inflate shelters for homeless people. It is a way to point at a social issue. To provide context and intervention at a local scale.

Photos by Roseanna Jackson

#ADDITIVISM AGAINST THE ART OF TLÖN / TIME TRAVEL BY METHODS OF MAGICK

"LET EVERY MAGICKAL ACT OF #ADDITIVISM NEVER BE WITHOUT A COMPONENT SACRIFICE. LET EVERY HUMAN MOMENT BE WORTH THE HISTORICAL TIME DESTROYED."

Step 1: Philosophy

There are a number of different magickal formulae by which to accomplish time travel. #Additivism is one of them. This magick is dangerous, and should only be used with skill and caution.

Time is the fourth dimension, and human beings are equipped to perceive three. When you can't experience a dimension, you see it flattened, like a shadow. A cube, moving in front of a light source, produces a flat square, or a six-sided polygon when the light is at an angle. As time changes shape, we experience the present, a flattened notion of duration in our limited consciousness, like the circular shadow of ripples on the bottom of a pond. We recognize that there is something up in the fourth dimension, doing something. We strive to step out of the dimensional constraints of our existence, to look back down at the muck in the bottom of the pond as we surf those ripples and make our own waves, to throw our shadow down like a missile onto others' memories. We will never quite manage this, and yet we try.

But we do have memory. Memory – a lingering half-life of the decaying present, is the furrows carved by time's shadow within our neurological chemistry like a wake. Memory allows us to see the change in time's shadow by animating relative difference like the frames of a film. This hologrammed artifice of the third dimension is the fourth dimension we imagine that we can see.

Our consciousness, where memory exists, has its own pseudo-dimensional quality, casting its own shadows outward upon the three dimensions we inhabit, as we try to change the world to resemble our desires. These vivid shapes and colors are also rendered flatly: as ideas, as categories, as progressions of action. The shadows we project from memory, we call history. That zoopraxiscope projects upward upon the underside of the pond's surface, and so we imagine that those images unite with the fourth dimension, and take us with them. But it is only a projection. History will never unite us with cosmological time, no matter how vividly we imagine it.

But while we can never join the dimension that we imagine history to have, we can affect that flat projection. We travel down those rays of light, from the screen back into our projector. This is our time travel. Time travel is a bending of our mental awareness of the present, via manipulation of history, and it is an art we have been practicing for years. Through it, we can vault over the years separating mortal bodies, we experience lifetimes in mere moments of interpersonal contact, we can shrink distances by harnessing the most incredible velocities of matter and energy, we can alter the lifecycle of the planet by adding catalysts and adding inhibitory processes.

Dragging stones across the earth is magick. As is refining thermoplastics from decayed hydrocarbons, and controlling their melt and flow through space. As is the fusion of helium from hydrogen occurring inside of our star. As is the fusion within the weaponry of a hydrogen bomb.

There are many ways to change history and travel through time. But they must be done with the skill that comes from situated knowledges and the consciousness of historical memory. Otherwise, these time travels lead to strip mining, to gentrification, to colonization, to rape, to ecological devastation, to genocide. This is no mere invocation. This is what our histories have shown us. These are the histories that we have chosen to forget. And in this forgetting, Tlön has flourished.

Step 2: Art Theory

Robert Smithson's goal was noble – to add the cosmic into our experience, by imbuing space and objects with the powers of the earth and time, by making them more meaningful for us than they would be on their own. He imagined a crystal made of mirrors, in which the universe is reflected infinitely, beyond any attempt to contain it. This celestial order, 'a monstrous system of mirrored mazes', is the promise of a world sculpted with labyrinthine passageways of illusions and phantasm. In this space, one might experience the wonder of the world.

In pursuit of this goal, Smithson carved up the earth, furrowing it with machines, building it up and digging it out to produce three-dimensional labyrinths into which one might wander. Smithson was one of the first land artists, departing the space of galleries and museums to seek the earth itself, as the most fundamental canvas for this cosmic art. His most famous work, Spiral Jetty, moved earth and stone from land to water, creating a curving structure of bifurcated classical elements on the shore of the Great Salt Lake. Under his direction, using bulldozers running on the burning exhalations of decayed organic life, the earth was cut – stained with the dimensionally additivistic tattoo of the artist, paving his labyrinthine mark upon the face of the planet. Smithson was also an essayist, printing his motivations into words, layering up ideas in parallel lines. He died in 1973, plummeting from the sky into

the earth, while traveling in a small plane, surveying the site for a new potential earth work. It would be macabre to wrap this death in linguistic metaphor – a drooping parabolic climax, at which inverted zenith the eye of the artist finally came into contact with its material, when the circuit of orbits between ideal and actual were finally closed. He was merely sublimated from the mortal coil in the grips of which we still flow. As his body vanished, the words and the earth he worked became more synonymous, over time. And so they spiral around us still, dated and simultaneously present, until we too disappear. Given such roiling words, half-buried in soil, how could we not excavate them? His body meanwhile, has the privilege of not being in a museum.

In words he describe his works, he builds up substance using phrases like 'primordial', and 'primitive'. He desires to scan and copy the aesthetic of monuments, of the 'Egyptian, Mayan, Inca, Aztec, Druid, Indian, etc'. traditions, in order to invoke 'primes that establish enigmas not explanations'. As if, by reducing the vastness of millenia past to a simple 'enigma', his own feat of magick would be the act of concealing the past within a polymerized mimicry of it, reducing thousands of years and unnamed past lives an invisible molecular chain, melting their work into his.

Smithson prefers an idealistic sense of history, in which vast contemporary actions can stand in for the passage of millenia. In which the sculpting of a park could somehow take the place of the growing of actual forest. He praises Frederick Law Olmsted, the designer of Central Park, for advancing what Smithson calls 'dialectical landscapes', in which development of the urban environment is not just aesthetic, but literal progressivism:

> The site of Central Park was the result of 'urban blight' – trees were cut down by the early settlers without any thought of the future. Such a site could be reclaimed by direct earth-moving without fear of upsetting the ecology. My own experience is that the best sites for 'earth art' are sites that have been disrupted by industry, reckless urbanization, or nature's own devastation. [...] Such land is cultivated or recycled as art.

But the late 19th Century Olmsted, today, would have been his own industry – that of real estate. Throughout his development of the boroughs of New York City, was a fundamental belief in the ability of parks to improve property values. In a similar procedure to what is called gentrification today, Olmsted added parks to the city as a means of creating 'natural' buffers of public green space, with the effect of raising the value of private property. As much as Central Park is considered emblematic of New York City picturesque qualities, the method of 'green' class stratification it introduced might also be considered emblematic of that city's current housing and wealth distribution woes.

If Smithson's sense of history is blinded, and his material politics are reactionary, his sexual politics border on the performatively violent. He speaks of his work upon the earth as 'cultivation' unambiguously, and embracing it in a sexual metaphor, rebuked his critics as scandalized psychologists:

> Sex isn't all a series of rapes. The farmer or engineer who cuts into the land can either cultivate it or devastate it. Representing nature once removed in lyric poetry and landscape painting is not the same as direct cultivation of the land. If strip miners were less alienated from the nature in themselves and free of sexual aggression, cultivation would take place.

Sex may not be entirely rape, but the earth has never been a woman. And furthermore, even if it was, declaring oneself a skilled lover won't make that woman into your artifice.

In Smithson's time, history was passe. To connect art into a lineage is to bow to royal paternalism rather than the power of the cosmic. To treat action with eternal consequence is to reject the beauty of enigma. It was enough to be progressive, to create change. Because as long as your change looks good, you are cultivating. And thus, Smithson seeks 'nondurational histories', rather than 'the value of temporal events in the natural history of Modernism'.

In his writing, Smithson invokes the wonder of Borges' labyrinths, in which every door revealed more doors, and every known fact engendered more unknown facts. But Borges told a parable of what happens when one fetishizes the three-dimensional image of the labyrinth, rather than the four dimensional journey through it. This, he named Tlön.

Tlön was an invented world, discovered by the narrator of Borges' short story, 'Tlön, Uqbar, Orbis Tertius'. A chance mention in an encyclopedia brought to the narrators' attention led to the discovery of articles, and eventually an entire encyclopedia, listing the categorical knowledge of this philosophically strange and completely unreal place. The people of Tlön, oddly, do not believe in causality. They consider it a myth, a paradox, a mere rhetorical trick of association, to say that one occurrence causes

another. 'The perception of a cloud of smoke on the horizon and then of the burning field and then of the half-extinguished cigarette that produced the blaze is considered an example of association of ideas.'

But slowly, Tlön begins invading the world of the narrator. Irrational objects mentioned in the encyclopedia appear. Tlön's history begins erasing that world's history, its science and philosophy replacing what had been beyond doubt. The narrator of the story, published in 1940 but set in 1947, describes it thusly:

> Ten years ago any symmetry with a resemblance of order – dialectical materialism, anti-Semitism, Nazism – was sufficient to entrance the minds of men. How could one do other than submit to Tlön, to the minute and vast evidence of an orderly plant? It is useless to answer that reality is also orderly. Perhaps it is, but in accordance with divine laws – I translate: inhuman laws – which we never quite grasp. Tlön is surely a labyrinth, but it is a labyrinth devised by men, a labyrinth destined to be deciphered by men.

It is the history of totalitarianism that Smithson's era is reacting against. Not just the fact of those terrible events, but their utilization of history as teleological justification for terrorism, in pursuit of a future foretold in the events of the past.

But in ignoring the systems of history, in refusing to acknowledge the oppressive class, gender, and race mechanisms in everything we do, we all become that much more susceptible to Tlön, and in fact, invite its invasion across our earth. We invite temporal microaggressions of sex, class, and race to expand into historical macroaggressions. We ignore ecology to focus on basic progresses of 'valued added', treating cultivation as industry. We do not so much deify the earth into a raped Gaia, as treat human bodies as one more vein of mineral wealth to be expropriated and extracted. And then we bury these poisonous secrets in our aquifers and wells.

Our cosmology must not be of timelessness, but fully embodied by time, set alive by it, running on that unwinding spring as the systems of our planet unfold and collapse before our eyes. History is our enigma, because we can never escape the fate that comes as a result of our individual and combined actions. In the broken down clockwork of our historical ecology, perceived through the limits of finite memory, we find the place where we must do our work.

Step 3: Magick

These spells are listed in order of temporal velocity.

Spell of Fusion
The sun's power density, given its gigantic mass, is about the same as a heap of active compost. You, composting, could be as powerful by weight as the sun.

Spell instructions: Respirate. Use your vascular and respiratory system to change glucose and oxygen into water, carbon dioxide, and energy. Pull each molecule out of the atmosphere, and transport it to your cells. Move slowly. Break molecules. Build new ones. Each breath is a balance, each molecular conversion is unavoidably written into history, and we must live with this, until suddenly we don't.

Spell of Geologic Transformation
In exposed strata, we read the molecular history of eras. In the erosion of the land to reveal strata, we see a three-dimensional exposure of history.

Spell instructions: Find two adjacent form of rocks, and learn what they are. Visible in this difference, is the mercy of time's destruction. What life forms might be in that rock? What life forms are working to expose that rock to you, so that you might learn their history? Somewhere in the rejection of dogmatic definitions of life, is bliss in catastrophism.

Spell of Crystal Growth
Molecules attach themselves in uniform patterns, building structures according to their inherent geometries and the full possibility of mathematical topology. In such regularity, is aesthetic shape, and potentially, translucence.

Spell instructions: Hold an electronic device that requires crystals to function. Anything with a screen, with a piezoelectric sensor, with a processor timed with a crystal oscillator. Nature's bounty, understood in natural laws, has allowed us to destroy scarcity. Considering this a spiritual truth, we now lash out at deserts. Eat salt and sweat, to dissolve and grow your own crystals.

Spell of Amine Feedback
These particular molecules are foundational building blocks in the chemistry of life, in which a nitrogen atom is connected to other groups.

Spell instructions: Ayahuasca brews are a combination of dimethyltryptamine, and a monoamine oxidase inhibitor. By changing the chemistry of amines in

the brain, the psychological experience of ego loss and inter-dimensional travel can be approximated. Or, if that is too much to handle or you don't want to be culturally appropriative, use caffeine to alter your amines, and experience time change at a more psychologically manageable rate. Turn all that is solidly built into rubble, and make that the new truth. In reward for your action, expect a kingdom of soil. Don't become a prisoner of methods.

Spell of Cellular Harvest
Units of life, independent on their own, united in bodies.

Spell instructions: Resist the urge to breed for a day, and instead, grow yeast in bread dough, or ferment something. Eat the product of the cell's labors, and feed your cells. In so doing, join with the entirety of human history, who have been feasting off the actions of yeast cells since before we invented writing. These previously unknown forces, mastered, make us drunk on our discoveries.

Spell of Plant Culturing
Movement without muscles. Bodies that split and combine. Photosynthesis is perhaps the most honest form of energy production, but even with roots one can be invasive.

Spell instructions: System are not materials, but an act of balancing materials. Grow something from seed. Grow something not from seed. Find one invasive plant and remove it. Embrace the sorrow of every species that has ever gone extinct, and the joy of every population speciated off from its progenitors.

Spell of Animal Communion
Socrates is a human, but not all humans are Socrates.

Spell instructions: Violence is our mighty method, and so we rule over an underworld. Interact with an animal on its terms, not your own. Become comfortable with the fact that you will never learn the animal's language, and then begin to speak. A battle is coming, which we deserve.

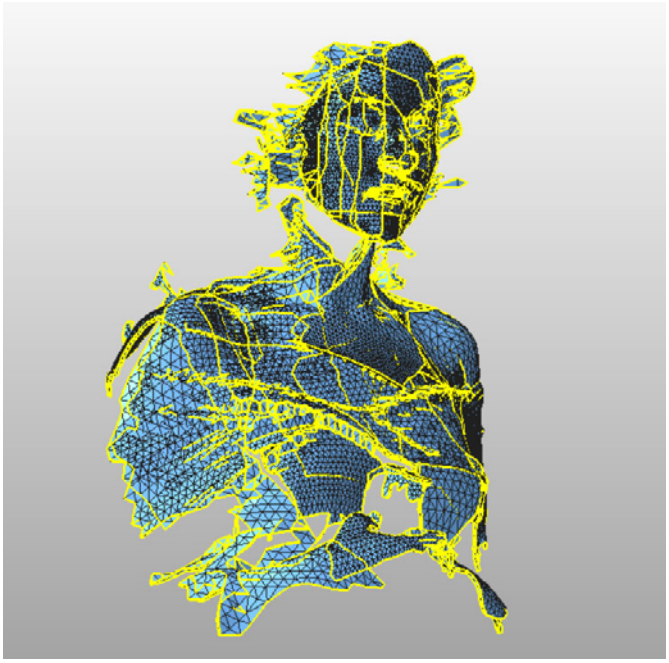
Spell of Artifice Process
What we make ends up making us.

Spell instructions: We have a garden in artifice. Heed its blossoms. Build something and then take it apart again. Fully. Return its raw materials to their molecular state. If you cannot do this, make a sacrifice of a possession to atone for your failure. Let justice be the guide for the sacrifice of any possession, let justice be the guide for the addition of any possession.

Let every magickal act of #additivism never be without a component sacrifice. Let every human moment be worth the historical time destroyed.

Tutorial for translating glitchy files into a form which 3D printers can understand

ON PRESERVING GLITCH

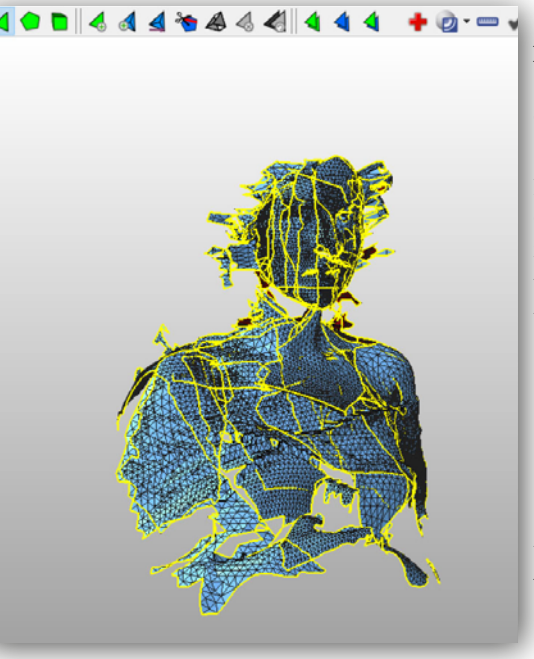


In a folder on my desktop, I keep a folder entitled ‘weird errors’. I also advise all my students to do the same. It’s inevitable that, in the course of learning to 3D model, scan or print, odd results can arise. Instead of committing these files to the wastebasket, I tell students to keep them all, along with a short note detailing the steps that led to their creation. As an artist I have always found it imperative to keep an eye open to the mistakes, glitches and strange detours that crop up while pursuing a project. (I now outsource most of my fabrication, but an unfortunate consequence of this post-studio practice is that errors are seen only by fabricators. I also ask my fabricators to send me images of any errors that happen and corrected before the artist can observe them and perhaps turn them into a new body of work.)
In my own practice, I misuse high-end 3D laser scanners in order to yield glitchy results. It has been a challenge to learn to 3D print my files without erasing their native aesthetic. Most tutorials on 3D printing focus on repair: patching holes, deleting areas of bad data, and smoothing surfaces in order to produce a result that looks ‘natural’ and closer to the original. In my practice, I do the opposite. Of course I manipulate my files, but I try to expose the glitches that arise along the way instead of ‘correcting’ them. An incomplete 3D scan reveals the incompleteness of human vision; made from a single perspective, it only takes a slight rotation to reveal the gaps and blind spots, all the things we do not see. Below is a brief tutorial on how to process a glitchy file in order for a 3D printer to understand it.

STEP 1: Obtain a glitchy file (image 1)

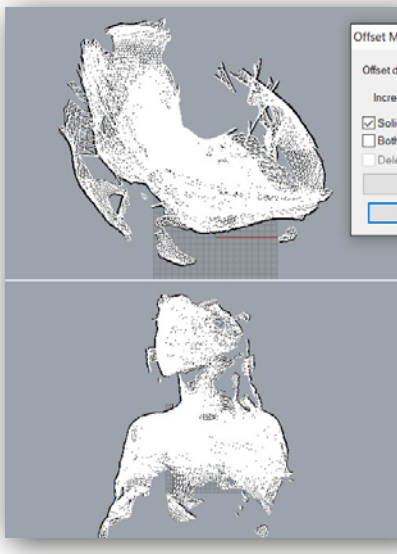
This could be a poorly done 3D scan, or a 3D file that arose when you did something uninspected: turned a sphere inside out, or ran an operation that caused your object to break out in a rash of polygons. The most interesting results often arise when you use a tool for a purpose for which it was not designed: in my case, try to 3D scan a moving body. My file is an incomplete 3D laser scan of my body, swathed in a bed-sheet and holding the 3D scanner's magnetic locator cube - which in the image appears to be some kind of ceremonial object. My eyes are closed to protect them from the scanner's not-quite-eye-safe laser beam - but it appears that I am deep in meditation.

STEP 2: ANALYSE THE FILE IN NETFABB BASIC (IMAGE 2)



Import using part->add in order to view and get some basic information on your file. If the dimensions do not look right, use part->scale to adjust them. Then look to see if the surface is open or closed. If you hit the repair icon (red cross on the toolbar) Netfabb will provide some statistics, including the number of holes in the file. You will be able to see if it is an open surface as one side will be red (in Netfabb, green is 'outside' and green is 'inside'.) In order for a 3D printer to understand a file, it needs to meet certain basic conditions. It must be a single 'watertight' surface; all the polygons must be facing the same way (polygon faces have a direction called a 'normal' that isn't usually visible in the GUI, but the printer software will need to know which side is the inside and which is outside, and this can get scrambled in glitchy files); and it needs to conform to the limits of the material you want to use for printing. This is called wall thickness and is important so that the final piece does not break on printing, or on removing from the machine. If you did not create your file in a solid modeling program like TinkerCAD, chances are it has no inherent thickness (my scans are merely skins with a zero value for thickness). The first step is to turn your shape into a solid, three-dimensional object. The very quickest way to solidify without filling in holes or cracks is to offset the mesh. This creates a copy of the surface at a uniform distance. After extensive experimentation, the only way I have found to perform this operation (if you don't have $10,000+ to drop on Geomagic) is to use Rhinoceros. It's not free but it does have a 90-day trial and a Mac beta here (if your file is largely solid, e.g. a scan of an object in 360 degrees that has only small holes, you may omit this step).

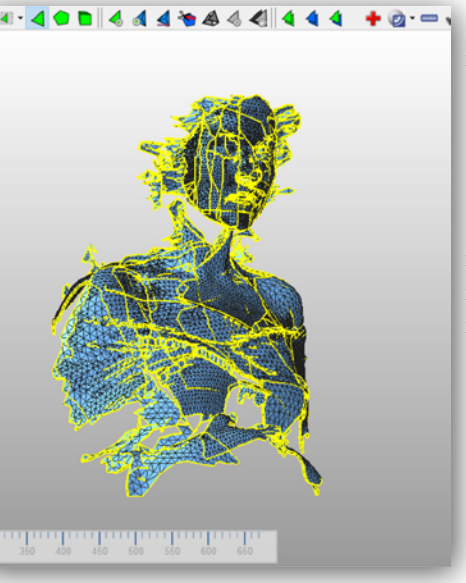
STEP 3: Offset in Rhino (image 3, file - BustOffsetInRhino)



Make sure your file is the size that you want it to be, then offsetit by a minimal amount. Use OffsetMesh in the Rhino command line and make sure that 'solidify' is checked. Export it as an obj and import it back into Netfabb. Choosing the correct wall thickness is critical: if you are ordering through a service bureau like Shapeways, the file must pass wall thickness requirements or it will be rejected. There is little room for experimentation with large factories

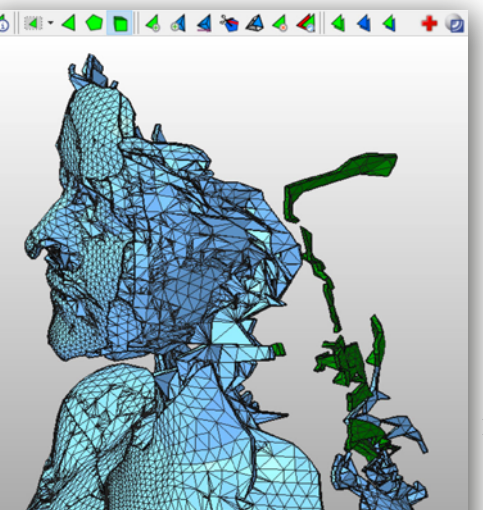
or service bureaus, as one print that does not go through correctly can crash their build and cost thousands in lost revenue. You may have more luck if you have access to your own 3D printer at a school or lab. Another reason to keep the piece as thin as possible, but no thinner, is that 3D printing material is usually priced by the cubic centimeter. You will also need to carefully consider wall thickness if you plan to cast the piece later: my foundry have had a challenging time with casting any prints that are under 3 or 4mm thick. (The irony and hubris of taking something as ephemeral as a digital glitch, then printing and immortalizing it in bronze, which will outlive us all - unless melted down for scrap when the shit inevitably hits the fan - is not lost on me.)

STEP 4: Netfabb Repair (image 4)



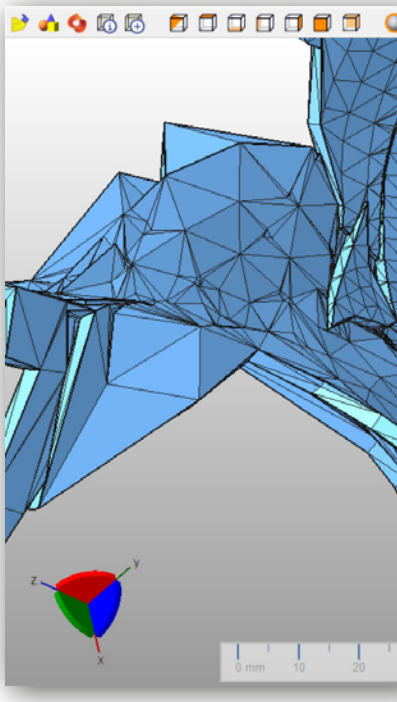
I have found that the most reliable repair workflow in Netfabb involves running repair operations in this order: stitch triangles, fill trivial holes, fill all holes, fix flipped triangles, remove degenerate faces. (Opt for this if you can rather than the automated repair. You may need to bump up the Stitch Triangles tolerance if you still see numerous small holes highlighted in yellow.

STEP 5: Remove Extra Shells in Netfabb (image 5)



In the Netfabb repair module, hit 'select shells' to select the main object, then hit 'toggle selection' to select all the other extraneous shells. (This is also necessary in order to avoid rejections. If any pieces are now selected that you don't want to delete, you will need to join them on manually to the main shell by deleting faces and then adding triangles to join them on.) Hit the delete key to remove these. The shells window in the repair module should now have a count of 1.

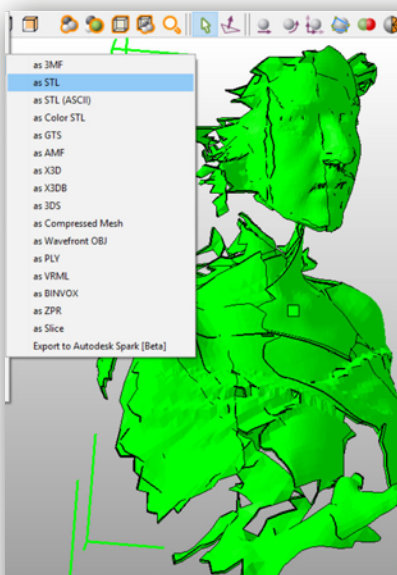
STEP 6: Manual Repair (image 6)



The workflow above is a brief overview of the most minimal steps that you will need to obtain a printable stl file. I have omitted any automatic operations that fill, smooth or correct the appearance of the file (offsetting first in Rhino preserves any existing holes, instead of filling them in.) However, there are no medals for authenticity in glitch art, and you are within your rights to alter your file in any way you wish before printing it. Avoiding auto-repair means you may want to delete or rebuild areas of your model. You can do this by selecting individual triangles or surfaces (tip - change the surface tolerance slider to select smaller or larger areas at any time, or use CTRL+ or CTRL- to grow or shrink your selection) then delete those areas, and fill the holes either in the repair options or by hitting 'add triangles' and putting in new triangles to fill gaps.

STEP 7: Finbal Repair and Export (image 7)

Check that your file is now a single error-free shell in Netfabb. Then export as an STL file.

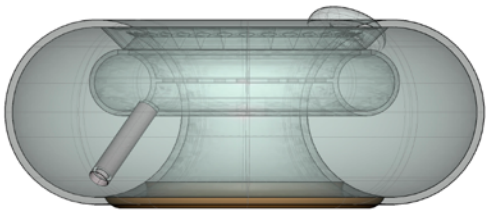


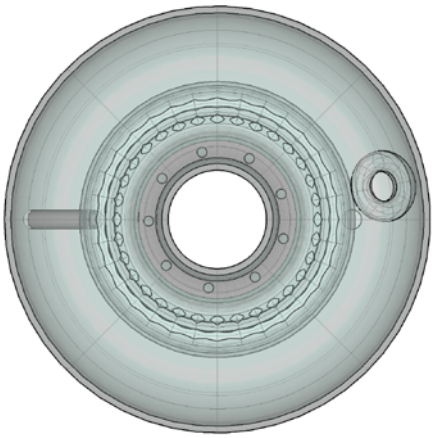
Nano Entity	Compost Juice Head Still	2016
Author	Project	Year

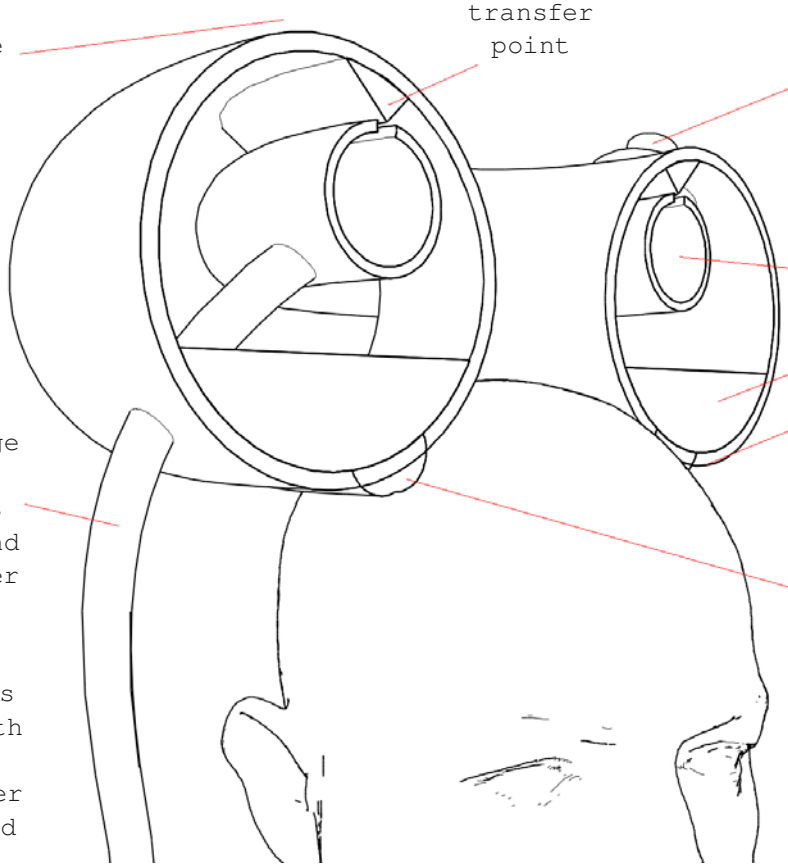
#device	#alchemy	#collide
Format	Theme	Action

Device to optimize the extraction of pure drinking water from waste compost juice

COMPOST JUICE HEAD STILL







A still is a device that selectively heats a liquid mixture and then cools and condenses the resulting vapor to separate and remove it.

Urban composting systems usually result in a separation of concentrated liquids from solids as they break down organic matter. This includes bacterial systems like Bokashi and even just a simple anaerobic bucket.

Proposed here is a device to utilize even more effectively the waste products to extract pure drinking water. The Compost head juice still uses the waste liquid to concentrate the waste juice products even more and extracts useful water from it. It uses a system similar to a basic solar wick or Transpiration bag to collect condensed evaporation through gravity.

The main structure uses solar and body generated heat to slowly vaporize water from the compost juice and allow it to condense and drip down into a collecting vessel from where it can be easily removed.

The end result leaves behind salts, metals and impurities. The solar process also helps with eliminating microbiological organisms and other contaminates through UV-A sterilization.

Ideal capacity for liquid surface UV-A penetration is around the 2-3 liter capacity.

The attractive rounded shape enhances the heat and light transfer and reflection and increases and optimizes the available condensation surface. Materials for the upper surface structure should be highly transparent if possible to enhance solar sterilization of the liquids. Ideally this should be printed in PET or a material that allows UV-A light to pass through it.

The lower contact ring area that has contact with the head should be a more flexible material for comfort and better fit and possibly impregnated with a metallic compound for more efficient heat transference from the body.

There is a simple in/out plug and drain system for adding juice into the top and removing condensed material from the base. A generic plug in tube and mouth piece attachment can be easily obtained from any hardware or camping supplies store.

This system could also be used for other inputs such as seawater.

Possible enhancements:

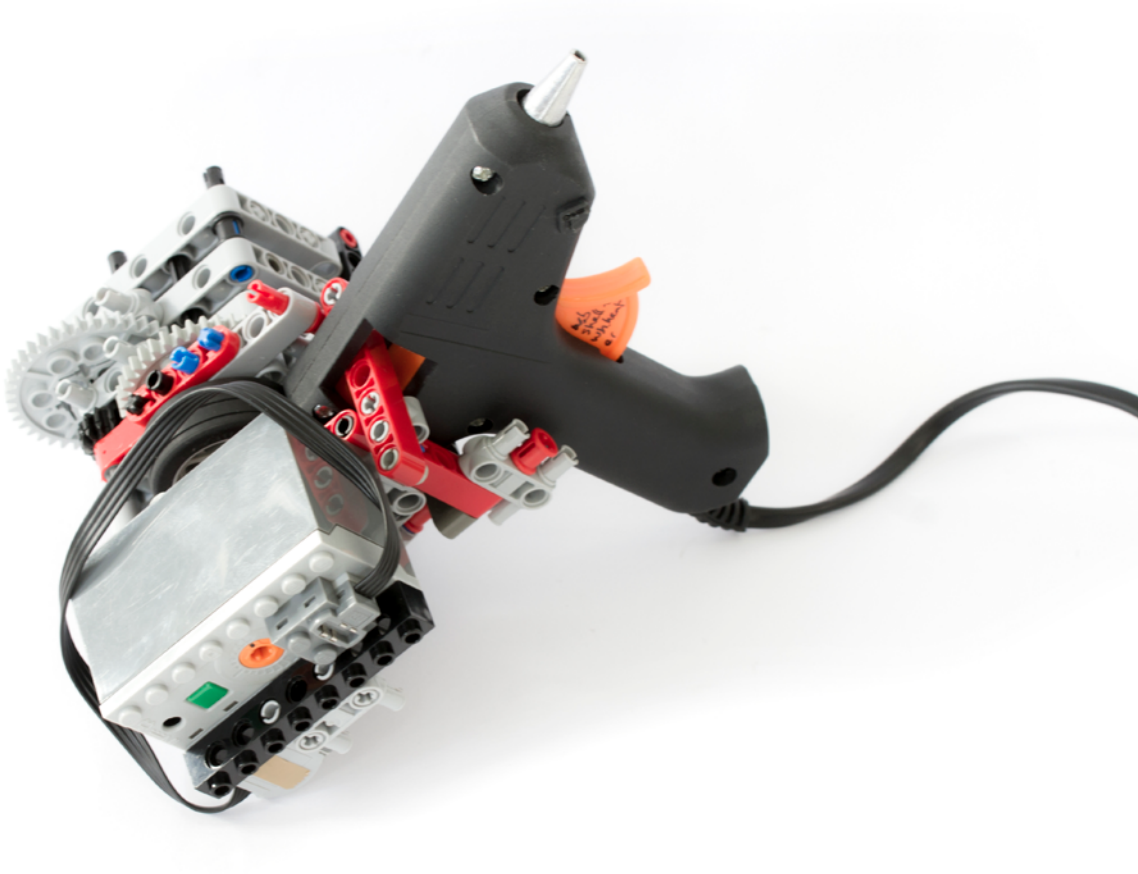
- A chin strap or bridle may be useful.
- A basic fine mesh micro filter could be added to the internal extraction point for the mouth tube to remove possible accidental contamination with larger solids. Or added to the open internal area used to collect the condensate.
- A small solar powered heating coil unit could be designed and added to the side walls during printing for cooler climates.
- More complex internal surface fins could be added to the internal condensation drip surface area to help collect more vapor.

Vimal Patel	Monomateriality	2016
Author	Project	Year

#blueprint	#matter	#constrain
Format	Theme	Action

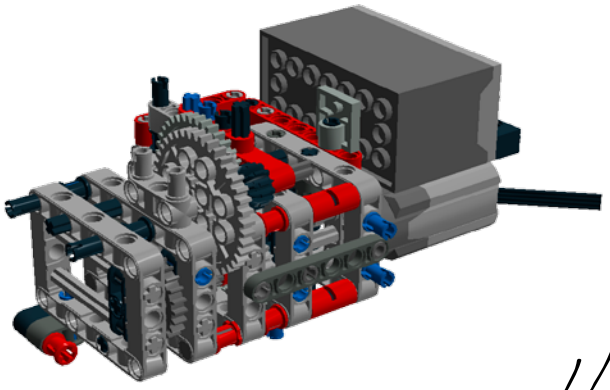
Handheld 3D printer, built with Lego and a hot glue gun

MONOMATERIALITY



Monomateriality combines LEGO with a hot glue gun to form a simple 3D doodler that extrudes a biodegradable filament. It's all about accessibility: the design for the LEGO-built extruder is open so that others can build upon the concept.

For a university project we were provided with biodegradable 3D printing filament and asked to make stuff with it. The intention was to explore ways of making products solely with this filament (*monomateriality*), so that both making and recycling things can be simple. *Multi-material* products (like helmets, which contain foam/plastic/adhesive/paint/fabric) pose an obstacle to recycling, which is a huge ecological problem. To replace the functionality of



multi-material products using one material, you'd first have to arrange the filament strategically to create 'varying zones of stiffness', like Lilian van Daal did with her *Biomimicry chair*.

Our university workspace has multiple UP 3D printers, so it made sense to begin there. These experiments showed that a variety in stiffness is possible, even on inexpensive 3D printers. Nevertheless, it was clear that the layer-by-layer deposition of material constrained the plane of flexibility to a single axis which made it difficult to make complex shapes (like a helmet). The ideal situation would be to extrude material along a path in multiple axes (i.e., with a robotic arm). This is a damned difficult thing to model and program, so we sought a simpler way.

What I did was build an extruder using Lego, and attached it to a hot glue gun.

I made a thing, which can be used to make more things. What interests me is not only the potential to make things functional *and* biodegradable, but the accessibility of the making process – all you need is Lego and a cheap hot glue gun. I'd like to have this potential realized in some way. To start, I made a digital model of the extruder, which can be opened using Lego Digital Designer.

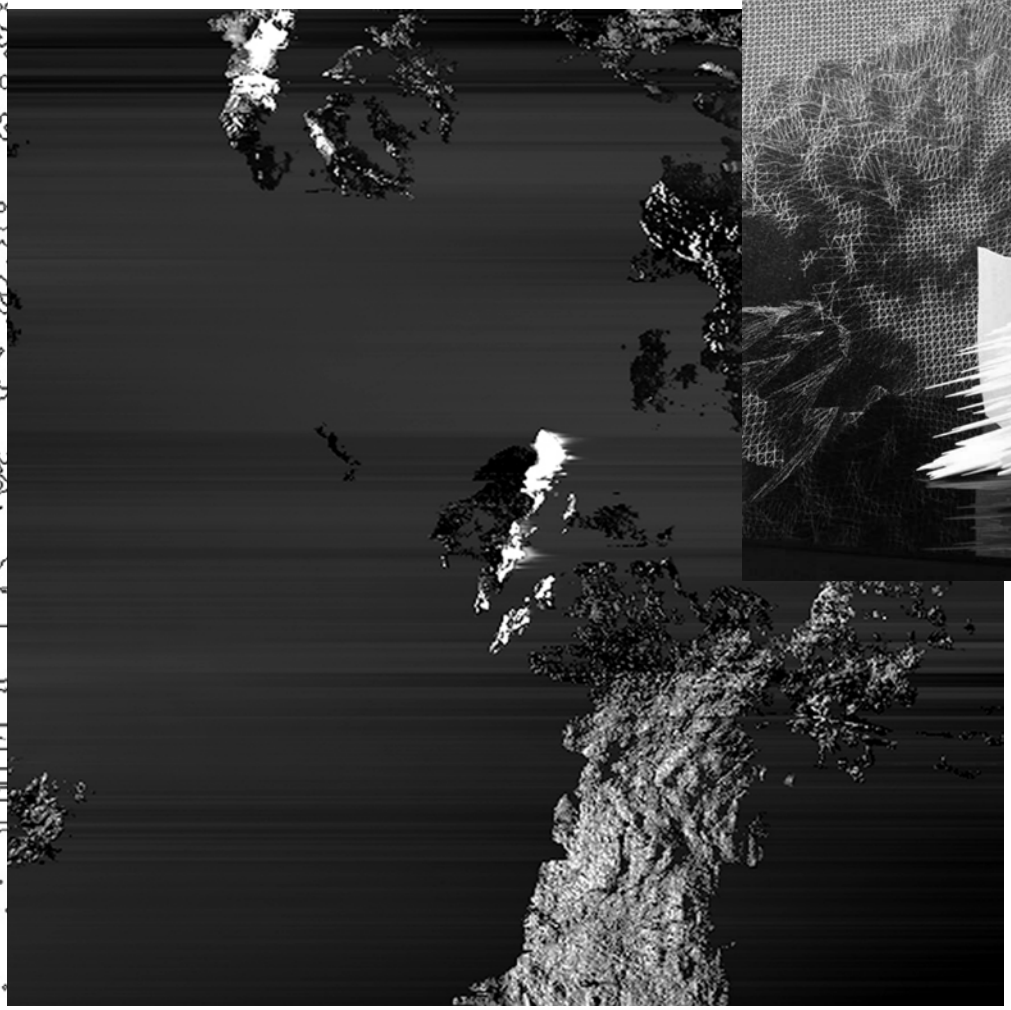
Disclaimer
This project is not associated with or sponsored by LEGO and does not in any way reflect LEGO's views or plans.

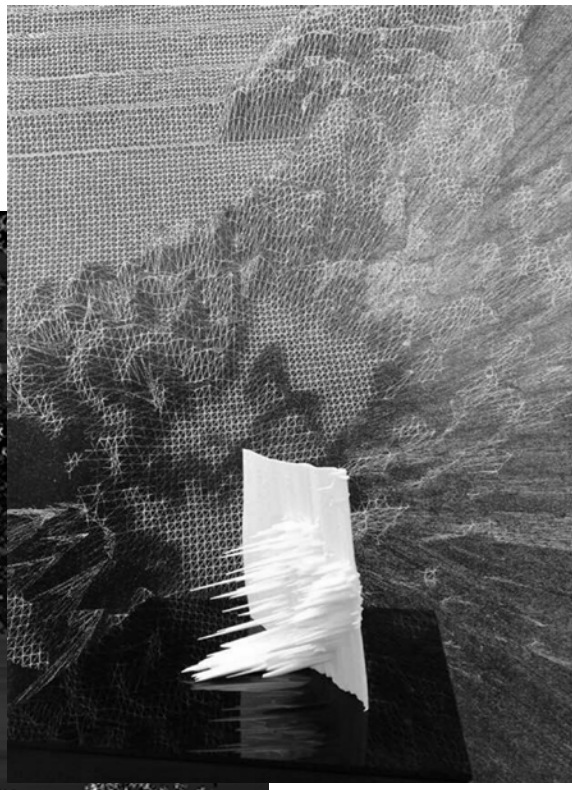
Katy Connor	Untitled_Force	2016
Author	Project	Year

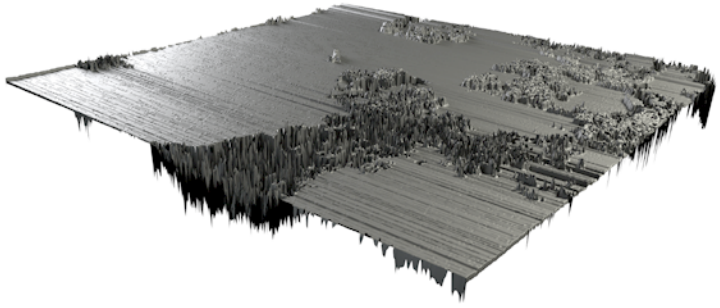
#device	#sense	#extrude
Format	Theme	Action

Haptic based scanning as body-machine interface

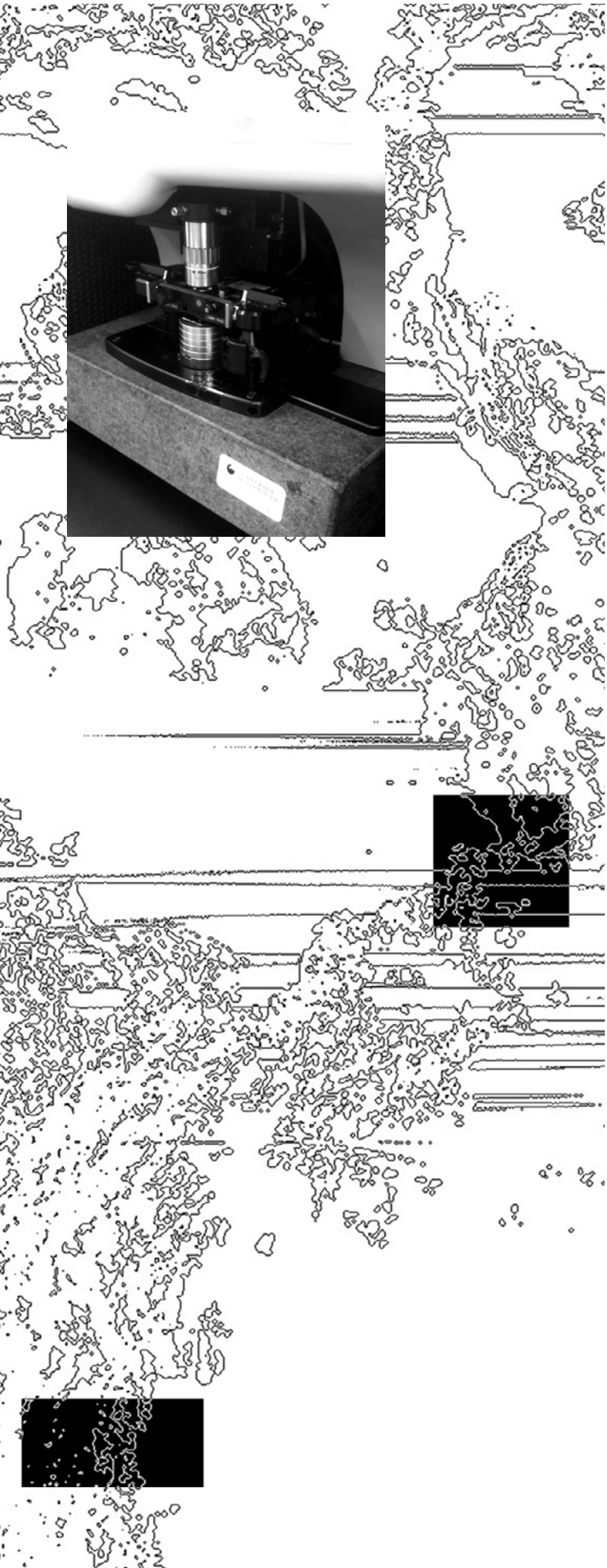
UNTITLED_FORCE







Untitled_Force is an alternative approach to 3D printing, in which process, materiality and indeterminacy are central. Rather than taking a design-led instrumental approach [CAD] this project takes the data from one field of 'modeling' – Atomic Force Microscopy (AFM) – and places it into the context of the 3D modeling software.



The OBJ data file is from an AFM scan of my blood. The size of this particular scan is 50x50 micrometers or 50 x10-3 mm (absolute size).

The AFM is one of the foremost tools for imaging, measuring, and manipulating matter at the nanoscale. In one of its applications in industry, AFM is used in developing the miniaturization of computer hard-drives. The information is gathered by 'feeling' the surface with a piezoelectric ceramic probe, which senses the surface of the material and measures the van der Waals forces between molecules. A data file is produced that can be read both as a flat, two-dimensional image, and as a topographical three-dimensional surface.

The image is therefore not produced through an optical or light-based (photographic) process, but a scanning process outside human perception.

> 'woman takes pleasure more from touching than from looking' (Luce Irigaray, *This Sex Which is Not One*, 1985 p. 26)

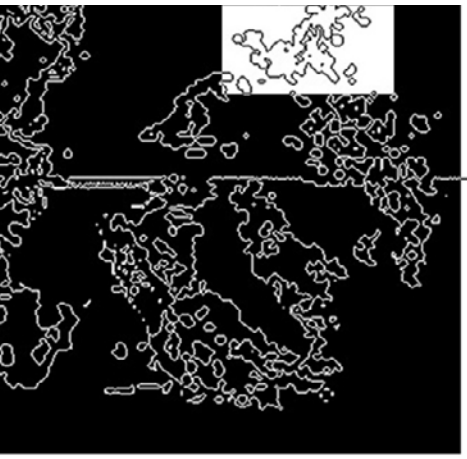
The AFM is a highly sensitive technological instrument. Housed in a sealed lab, it demands that its users wear protective lab overalls. In reflecting upon this physical sensitivity to vibration, to touch, invites the user into a haptic, responsive relationship with the machine: 'touching, not mastering' (Laura U. Marks, *Touch*, 2002 p. xii)

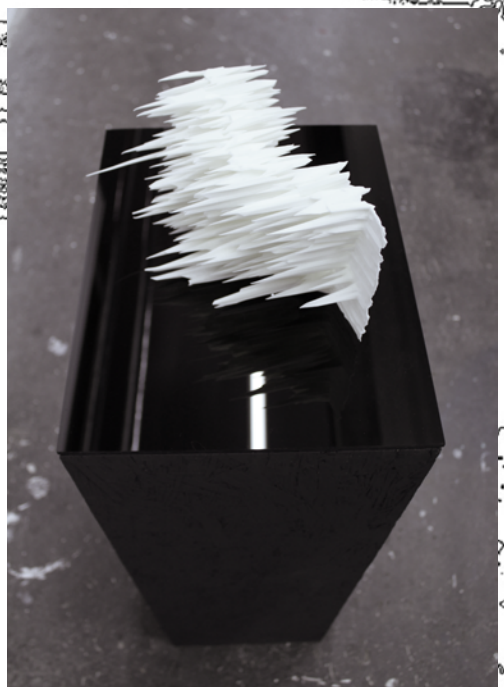
Thinking about this process as a haptic relationship provides for a sensual encounter between the natural material of my body and the touch of the machine: it is through a haptic sense of touch that the topography of the sample is measured.

> 'Optical visuality requires distance […] in a haptic relationship our self rushes up to the surface to interact with another surface.' (Marks, p. xvi)

Seen within the performative idiom, the resulting data file Untitled_Force is no longer a scientific representation 'of blood', but instead becomes documentation of a specific (moment of) encounter between my body and the probe of the microscope, in the space or site of the lab (see photos).

In this context, where technology, art and the imagination meet real phenomena, the data collected becomes poetic debris, which can be analyzed and structured at will.





*Footnotes by Dorothy Santos

AN ECOLOGY OF LIGHT BASED ART

"SPECULATING THAT SIGNAL FLOW BRINGS HUMANS WITHIN REACH OF A CONNECTED GREATER CREATIVE, EMPATHIC, AND HEALTHY STATE OF BEING, IT IS NOT A MATTER OF 'IF' BUT RATHER 'HOW' LIGHT BASED ART BRINGS THIS TO THE SURFACE."

Giving up on the notion that we can know ourselves, our boundaries, or our ecologies, I would like to explore a terrain of thought that projects a new experience of light based art. That we must look anywhere at all beyond ourselves, for one, is an important starting point. There are many different places one could begin, as a reference point to frame the conversation: Plato's Cave, of course, never ceases to be a wholly complete allegory to our world of information, perception, and creation[1] ; the camera obscura[2]; the photograph; new landscape photography; The Situationists International and Gutai; Jean Paul Sartre; the new forms derived from new tools as video unshackled cinema; Gene Youngblood's Expanded Cinema; James Turrell; Nam Jun Paik and the beginning of Interactive Art; Ollafur Elliason and the Scandinavian Elemental art, architecture and design movement; radical geography; Jorge Luis Borges or Italo Calvino; Buckminster Fuller; Lewis Thomas' microbial gardens or cells or selves; Guilles Dellus' deterritorialized stuffs[3]; Manuel de Landa's social sedimentary histories… and yet, we might throw it all away.

This essay provokes the boundaries of different bodies in their analog, digital, cultural, and organic forms – mapping a network topology of ecological bodies. Light based art in the anthropocene is a new nervous system for humans to restructure historical misconceptions of self, society, and linear relationships between the analog and the digital. What is information phenomenology?[4]

What of the forms to come? The futures? Not the technologists' singularity, the perfect execution of precision, galvanizing at a point of unquestionable uncertainty – but perhaps? Let's instead grant the full potential of the emergent spirit. It is a little bit of magic, of course – quite possibly all magic. At the center of it all is you. Not any actual center, in fact there is so little of any orientation from which to actually describe a position – that I am fooled into believing my skin represents the edges of my thought system is baffling enough[5] – but to have a starting point or point of origin amidst a galactic soup of information, coming in and out of forms, expressing itself in different ways for indeterminate amounts of time, this is far too fragmentary to hope for.

We start from everything. This is how we will begin. From now, looking outwards and backwards. Fragmentation is so alienating, we are community: a social fabric, an ecosystem, the mesh, a signal flow.[6] Our rituals are carried in our DNA and we taste our histories in the wind.[7]

Signal flow is radical inclusivity of shared matter. We are the mesh and the new information phenomenology expresses itself beyond perceived boundaries of our own bodies, but new neural pathways, water-systems, optic-fibers, microchips, and sediment connect us together. Speculating that signal flow brings humans within reach of a connected greater creative, empathic, and healthy state of being, it is not a matter of 'if' but rather 'how' light based art brings this to the surface.[8]

We see that we know nothing, and we carry on, with nothing, taking in everything. In fact, our current extensions of ourselves make that easier for us. New devices: our pocket brains, which we can write about with the same fascination and fear that our predecessors discussed the rotary phone or the radio, or the television.[9] Now it is the Internet, or more granularly – mobile UI, and soon enough it will be replaced by something else – something that delivers more perceptually rich, immersive, pre-ordained fact moments describing consensus based truths. Of course there will be. It is uncanny how the cultural theorists of the post-modern era (the era of naive media and post-structuralism) discussed global networks and nuclear reality with the same literacy as our contemporaries to consider the complexity

1 **Yes. I agree and I've always relied on this theory to help me better understand something like epistemology. Then computer science enters the picture and researchers start showing us that AI has neural pathways! What tha?! – Totally spewing out what is coming to mind. So do NOT mind me if anything I say is pure shit. Trust me, I feel like you understand and I don't even know why I'm explaining myself right...**

2 **I can't help but think of surveillance.**

3 **In grad school, folks LOVED (like me) or HATED D&G (not the fragrance or brand, but I love referring to them as such, which is completely ironic considering their capitalism and schizophrenia text). BUT my favorite aspects of their work were the ideas of striated and smooth space. Is this what you're referring to here? Or, more war-machine (totally thinking of Virillio now). But seriously, I actually tried to explain a conceptual and performance-based artwork by framing it through the lens of striated (materiality) and smooth (abstract) spaces. THAT was tough. I did it. But it was tough. I swear, after reading through D&G, don't you feel like you've done a SHITLOAD of drugs?**

4 **When I think of phenomenology, I think of the sensual. Can information be sensual? Perhaps it can be, but it's difficult for me to think of it as tangible only because I feel that information such as data visualization becomes yet another abstraction of our lives as if to tell us something new. To remind us that we're not alone. But then, what good can come out of such an experience of information and/or data?**

5 **Have you read Gayle Solomon's work about body auxiliaries? In any case, I'm thinking of that damn Rachel Dolezal case and trans identities. For some strange reason, two pieces popped in my head, Freckles by http://jaakko.co.uk/ and Mary Flangan's work http://maryflanagan.com/works/**

6 **But noise can be the thing that actually forces us to focus on the signals, yes? I'll tell you this, I've always been into audio constructs (i.e., we base behavior and responses to the way things or people sound). I think I got into this due to my multi- culti background.**

7 **Let's not forget the stars now.**

8 **I think of photographer Elizabeth Moran who talks about agential realism in her work on light and its relationship to photography. I'm being redundant here, but I love the idea of intra-actions. Karen Barad is the genius behind the theory of agential realism.**

9 **I keep thinking of Gayle Solomon. And I'm ALL about Fox Harrell's work. I think I mentioned him. His notion of cultural phantasms based off of our ability/inability towards critical computing really defines a lot of what becomes our, as you put it, extensions (I'm not talking McLuhan either, even though he's dope).**

of the inter-networks of Internet now – meaning, the theorists of the post-human era. And yet, as the techno-chic moves forward and the style that describes impatient knowledge, with all its in-vogue language and phenomenologies[10], I can rest assured that this writing will appear as dusty as the shelves of the Dewey decimal system. What does timelessness mean anyway?

If a goal is to say that we know something about how things are, then let's hope we can say anything at all without sounding absurd to those who come after us. And thankfully those who came before us are not always around to see what we've done with their thoughts.

Loosely connected stuff that shapes everything:

On Gender

Briefly, a moment on 'us.' Who are 'we'? Bodies are fluid and identities are self enforced. That is to say, I say 'we' to mean the sediment from which our cultural edifice takes shape: the soil, the geologies, the memes and genes, the cells and data bits, our antenna: the connected cosmological nervous system. But not just these – bodies are sacred and are stories. Conforming to the gender identity binary is to peer no further than the surface.[11] Like refusing that information is exchanged through light waves, refusing that we are anything other than queer assemblages of self-representing terrain would be myopic.[12] Signal flow is radical inclusivity. Gender is fluid terrain. 'We' is a cosmological togetherness, not a cis-male misrepresentation. Our cyborg state requires rethinking gender norms. Then again, our fear of fluidity has always necessitated rethinking gender.

Ecologies have consciousness, in the sense that science understands what consciousness is, and that humans possess it. So does the biosphere. Consciousness is not only for the humans. As everything is torn away, why would we stop at gender? If my body is a microbial garden, shaped by water flow and serpentine past – what then? The Internet is a platform for catalyzing thought; memes proliferate, and drift in more complex thought arrangements. Consciousness is not only for humans.[13] It emerges from a matrix of forces, feedback loops, and histories. But then, we are afraid of that word – matrix, so instead – the mesh. The mesh is consciousness, not a form of consciousness, not a bigger consciousness, the consciousness. The consciousness that I am, that we are. We are it.

It feels some how dulled out now, that we would even need to explain queer body identities.[14] What with the radical bodies taking shape and falling all around us, why would gender be any different?

On Water

These pathways carry the source. Sediment is information. Elemental material provides instructions for the riparian zones along the way. Imagine the new streamlets at 14,000 feet in altitude each spring. Ice melts, new neural pathways drip their way down, as they journey to the sea. There are fewer now, in California, as drought defines the new normal. Along the way, growth proliferates, soils fuse, and sediment is compacted. Under great pressure, this is the birth of our great fossil fuels. To think, the entire edifice of modern civilization is shaped by the same information flow that produces a flower. Serpentine is the California state rock. Entire plant communities have adapted to serpentine soils. Soil is primarily rock after all. Consider all that information, all that time. Millions of years of sediment, flowing down those novel streamlets each spring. These too are sacred and are stories – pockets of history redistributing themselves in a closed loop all along the signal flow.[15] Importantly though, it is not just along the stream's path, but in the clouds too. It is all around us.

On Desktop Phenomenology

What is the difference between how a PDF and Word document make us feel? What I really mean here is: the phenomenology of information. Desktop phenomenology is a part of the signal flow, in any case. When the clouds rain it down, they are spreading that flow – a decentralized redistribution of information.

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10 I'm dying to hear what you think of Ex Machina.

11 You should read Gayle Solomon's work. She pulls a lot of stuff from psychoanalytic theory and Merleau-Ponty to discuss the transgender body and the ability to be fluid. Seeing a 'felt sense/self' and how we work with our bodies (that are actually malleable). You would enjoy what she has to say about body auxiliaries, which is something she pulls from MP.

12 AND Karen Barad (who is at UC Santa Cruz) and her idea of agential realism. The wiki entry is pretty decent, but my homegirl in grad school discusses extensively in her thesis in relationship to photography (and her MFA thesis, which was on ghost hunting and paranormal photography). My point: this entry, in particular, reminded me of something similar that Barad is getting at when she mentions that things come into being based on intra-actions. Also, here's the wiki, which is decent for Karen Barad..

13 It's also a place to dismantle harmful mythologies. I think this is why I'm particularly interested in new media/transmedia and digital artists working to reveal marginalized bodies through the use of technology. It's almost as if people will only pay attention if it comes from the internet, some mobile device, or some mediated form. I WAS just sent a BBC Future article about people being possessed by computers. We should discuss!

14 If anything, this act of explaining queer body identities seems necessary. All the more necessary especially with advancements in technology that already seem to not only monitor behavior, but have biases built into them. The work of Zach Blas comes to mind when thinking about how we begin to look at and examine how technology affects these identifications. Another theorist that comes to mind is Sarah Ahmed and her idea of strang-ing/queering the body.

15 Ana Mendieta. Ana Mendieta. Did I say Ana Mendieta? I did. Talk about redistribution into the signal flow!

Those elements grow the rare earth, the metals; they are synthesized to shape properties like plastics. In this way and in others the signal flow is connected, not only by elemental force, but also by organization strategies. Screen space is the phenomenological output of commands – much like agency as our body-organisms instruct our brain-awareness. One way to imagine this is: if we give a command to a computer, the computer will execute that command internally, regardless if we see on the screen that it is doing so, presuming the computer is working properly, etc. The screen acts more as a comfort buffer. Our bodies are similar. I don't need real time confirmation that my heart is beating to know that it is doing so. The fact that I am alive is sufficient assurance, presuming that the body is working properly, etc.

The screen is a comfort buffer then, nothing more, despite the galaxy of activities, the distances, the networks, or the connections, that the computer is processing.[16] Like any comfort buffer it causes us to feel, and the ways we feel are shaped by the nuanced relationships we each uniquely build. Like a rock one finds during a childhood walk with a distant friend, the power of this object is greater than another rock, regardless of physical similarity. Likewise, a particular habit, or frequency of use, might bias one object over another.

PDFs and Word documents are no different. Like texts or email, cable television versus Netflix, mobile devices, and the future mediated technologies, these comfort buffers cause different emotional outputs in us; because we use them differently, they arrive in different moments of our lives, for different functions. Work versus leisure, for example, as tools to disseminate information and proliferate horizontal access, as opposed to passive entertainment. Within us, we react differently to these circumstances, all of which arrive from the simple rectangular, pixilated comfort buffer. One simple command leads to a cosmology of other organizational strategies.

On Scale

Network topologies are different scales of connectivity. Signal flow is radical inclusivity because information phenomenology expresses itself as a healthy ecology in all forms. That is to say, no comfort buffer is required to proclaim health, if a city, or a cell, are functioning healthily. Instead that health is reflected in a well balanced, well distributed, diverse and dynamic exchange of information – like equal racial, ethnic, gender, and class distribution of access to resources. A certain microchip, Intel's 2006 Montecito chip, was designed to reflect a strategy of organizing information at a certain efficiency that some urban planers have considered using to design civic infrastructure. Fungus represents another interesting representation of decentralized connectivity. By some accounts, as much as 90% of the earth's root systems are inhabited by symbiotic mycorrhizal fungi. The exact function these fungi play in the rhizome is quite simple. It increases water absorbing surface area in root systems and in turn extracts needed nutrients, the roots absorbed from the air: carbon, vitamin D, etc. This is a strange signal flow indeed, and entirely interdependent.

If more comfort buffers are required, consider this: fungi are a perfect expression of the 'mood' of an ecosystem. In fact, nothing more perfectly describes the state of a microclimate than a fruiting mushroom body. It is exactly a result of the nutrients, temperature, atmosphere, conditions of the rhizome, location and arboreal representation. All these inputs, outputs, and stochastic systems work in concert to shape the mushroom. They are the mushroom. There is no distinction between the way it appears and the way it came into being. Likewise, our cities, our networked systems, ourselves, are the output of great forces constantly in motion. Recognizing the most empathic, most dynamic, most diverse, most creative ecologies might be a valuable exercise in the anthropocene. This might be possible through observing the acoustic ecologies of complex ecosystems. For example, in habitats that have molded to their own signal-flow over millions of years of simultaneous exchange. Humans always want the most, but what does that mean exactly? More importantly, do we actually know what we need the most of?[17]

On Projection

After a meandering path through sediment, soil, scale, and flow, we've arrived at the source. We could not arrive at an ecology of light based art without exploring the entire organism and sometimes this requires unexpected deviations. Unexpected until now – by this point, it should be clear that information travels a complex path. This energy is represented efficiently in many organic forms – fungi for example, and not efficiently in some human forms, i.e. the processing of fossil fuels. Our task in the anthropocene is to use light based art to illustrate the full scope of the energy signal flow.

Etymology: projection
Latin – proicio (From prō ('from, in the place of; for') + iaciō ('throw, hurl').)

16 What about the disabled body? The body that cannot see. How would one grapple with the notion of desktop phenomenology in cases such as this?
17 Time and space. Humans always want to control them.

Our state of visual awareness is informed by the semiotics of our daily lives. We organize information because we understand the signs around us and build on them. Whether we are conscious of it or not, this is the impact of cultural space. Projection art, in other words the projection of 'meaningful' information, proposes alternatives to the terrain surrounding us. At present culture is negotiating a transition from understanding physical space and digital space as different paradigms to seeing them as a fluid geography within which the distinction between the two is only the difference between two separate objects, like a bench and a glass. In this sense, projection is energy flow.

It is natural enough to see light as energy. It comes from the sun, a near infinitely more powerful generator than any we will see on this planet. Light also comes from electricity – we flip a switch and it illuminates a room. In both cases, light is the physical manifestation of an energy flow. Often, however, when utilizing light as a mechanism of delivery, of culturally understood information – representational symbols and codes – let's say language, we don't see the energy, instead we see a readable text. One might say then, that energy is the subtext of projection.[18]

Bear this in mind, as the scaffolding for my premise, because energy itself has a number of abstract components also that are the result of reading the text too directly and forgoing the subtext. I began with the word information and subtly shifted the discussion to energy. Projection art as a tool helps sort out the ways in which culture anthropomorphizes itself unconsciously. There are two different interpretations of energy in projection: the energy required to power the light source that delivers the coded symbols or images, and the light particles themselves that are literally projected to another landscape. What else is projection, other than flinging information into space?[19]

My focus on energy is of the second interpretation. I bring up the first simply to ensure a fully formed understanding of energy in this context. Culturally we are not very rigorous about our definition of energy, which leaves the possibility for many pitfalls, misunderstandings, and misrepresentations. As we excavate an understanding of this second interpretation, it may inform the first. Light particles are the subtext of projection, the medium of delivery. The light is an energy flow, transported from one location to another, from a digital space to a physical space.
What is the information? With the advent of machine intelligence and automated networks, we are reshaping our understanding of information from something that 'we' can read, to a readable transaction. In other words, a transaction that 'we' cannot, necessarily, read. Something can read it perhaps, but not us, not a human. What else would that be? Everything: the mitochondria in our bodies, the genetic code of fungi, computers built to interpret financial algorhythms, genetic therapy that occurs in milking mammals, Google Adsense. Each of these 'readers' interprets a set of information, essentially series of values and symbols, that are unreadable to 'us' and possibly arrives via a mechanism that does not even resemble information in a form we recognize.

Consider light in this way. Light is energy, but what does that mean? Light particles are different wavelengths that are described by sets of information. The information determines the type, temperature, range of light, etc. In essence, different 'readers' interpret the light wave information and react accordingly. In the 1990s, CD players interpreted light information to play music. Our eyes interpret light information as a readable canvas, our iris physically changing to compensate for different exposures. Our skin cells interpret light information to protect our bodies, and changes color and sometimes texture in reaction. In each case, the reader responds to the specific code carried in the light energy.[20]

Projection art offers much more information in this case than what we perceive. The content – the subject matter understood in a cultural context – is only part of the information signal flow. Behind the content, shaping the form the medium takes, is the coded information that transports the energy and informs the readers how to interpret it. The light information is a physical set of instructions that illuminates a set of digital instructions (the code of the content). Certainly not all projection art is digital, but focusing on digital content reveals the fluid transcendence between digital and physical spaces.

As has been discussed, projection is a complex form of information exchange. It is not often that we are able to perceive a signal flow in physical space that is not physically 'connected.' At least, not with

18 But will it be natural to see projection mapping in the next 20 years? Probably. It makes me wonder how human vision and perception will change. Will holograms become so commonplace that they then become a part of what 'natural' light means in the future. This has me thinking of the term 'natural' and can it really be said that it even exists anymore. Humans are subject to so much un-natural light that it has almost become expected to see under fluorescent or Tungsten.

19 I started to think about smoke signals for some strange reason and this idea of ancestral futurism and how we are just 'inventing' things that have always been around. But technology advances so rapidly that we don't experience and relish the change (much like the Midi disk). There's such an ebb and flow, projection as a thing in space also depends on the space and who is perceiving the projection.

20 Reminds me of some Oliver Sacks I read during grad school.

such a direct translation; wireless internet links a great deal of information to physical spaces, but it is not always clear where the information is coming from, or which bits of information in physical space correspond to which bits of data in digital space. For example, if I put my hands next to a wireless router and draw a square in the air, it is impossible to know if or what data that square of space corresponds to in my computer. Projection on the other hand provides a point of origin in which the same information at one point is represented at another point. There is no 'physical' connection that we can perceive and we can visually understand the trajectory of the signal flow.[21]

But there is a physical connection – a connection that requires we shift our paradigm of perception in the physical world. We cannot read the information exchange that illuminates the pixels and describes the compression, resolution, bit depth, and media type in a projection. That is the subtext. We read the culturally contextualized symbols represented on the projection. The subtext, however, is a physical connection. The information that we cannot read, the light, creates a physical connection. I don't mean that light as a phenomenon links two bodies; the information that the light carries, the instructions, are a pathway that builds a connection. In the most material sense, the information are physical events that communicate orders and causally change a body.

The implications of projection art are exciting. Binding the physical and digital terrains in perceivable ways forms new bodies, a body whose signal flow transcends the boundaries of our cultural interpretations – as though I were to perceive directly the impact a thought made on the flap of a butterfly's wings. Or the impact a computer processor has on my mental state, regarding a specific thing. Projection art reveals new limits to the geographies of bodies.

As discussed earlier, we are all landscapes. We are inhabited territory colonized by different narratives and histories. Our identities are largely formed by the exploration of our terrain. For better and worse we have conquered much of it. It is with a sense of entitlement that we have laid borders and boundaries around everything: political boundaries, emotional boundaries, physical boundaries, biological boundaries, cognitive boundaries, and more. With a sense of innate purpose we have explored the physical terrain, we have overwhelmed and redefined it. Projection art proposes new forms. It alters the terrain and thus creates new territory. Reshaping our identities in the process. The terrain has always been temporary and ineffable. These are simply new tools for excavation.

The text of a projection is not quite the same on its projected surface as it is at its origin. The text binds itself to its surface, changing it. The subtext – the information – is the same, but the meaning changes as it creates a new landscape. The parameters between the digital and physical might feel distinct at the current moment. The physical – visual – experience of a projected space might not feel as though it fully integrates the digital and physical. After all, there are tasteless boundaries, the edges of projection that remind us how we so frequently use our digital tools like windows, only peering through them in rectangles instead of fully entering or expanding them. That is not to say the digital alone represents more expansive space.

Projection reminds us that signal flow is physical. The same text and subtext of content and information are being exchanged amidst a vast ecology of physical events: biological chemicals, neural transmissions, waterways, sediment, and more. The landscape that reveals the projection, the surface onto which is projected, receives the subtext too. That is to say, it is changed, physically. It is hard to intuit what the subtext might do to the surface; an emergent event catalyzes, much the same as the visual experience of projection reshapes a way of looking in a space.

We must use our imagination and project to the extent now capable. Light is not bound by dimensionality or shape. New integrations with the physical landscape require experimentation and shedding our previous conventions. The framework of projection does not resemble old notions of viewing. We are as much amidst the viewing landscape, simultaneously separate observers and integrated participants, as we are privileged to watch from afar. As though the signal flow was ever separate, true though past modes of viewing made distinctions.

To an unknown extent we are shackled by old modes of viewing. Much of our visual world is constructed of signifiers using a linear system of semiotics. The landscape itself has not changed, in so far as it ever was static, but the visual tools we use to build meaning still rely on an infrastructure of past paradigms. There is a certain utility to viewing material behind a digital rectangle, but a canvas need not be limited in such a way. Projection-mapping does engage physical space as a canvas with more nuance, but generally it is an attempt towards the hyperreal. It is a simulacrum. Instead of imagining new forms, projection-mapping displays like a master cartographer's skill and

21 **Beg to differ, especially if we start to look at the possibilities of third space.**

grace. The result is often pleasing; it maps terrain with detailed affection, yet it tells us nothing that the landscape itself could not already offer. Only in radical geographies do new forms emerge.[22]

Projection art must be more rigorous. The artist must look to the subtext to illuminate new signal flow. New modes of viewing replace reflexivity with parallel bodies amidst a feedback loop. The terrain is informed by the interaction of the physical and digital as it crystallizes into something else. More than simulacrum, it is a new body.

The physical and digital dialectic no longer feels sufficient. Rather than binary, it is analog – a gradation of spaces at once digital and physical. Being bound by our old viewing paradigm, we don't yet understand what the gradation is; we can't viscerally experience a fabric of physical and digital simultaneity. No more than we can viscerally experience the simultaneity of our environment. But projection art aids in our process of discovery. It provides a framework for new modes of viewing. It reveals a signal flow for the texts and subtexts of new identities.

On and On

We were here before we were here, and we will last so much longer than we could have ever imagined. This essay set out to organize thoughts in a way that suggests the simultaneous signal flow shaping our ecological phenomenology. It is speculative and it drifts, in an aim to resemble the rhizomes and clusters everywhere. It ascribes great importance to light as the vessel of information. Light art in the anthropocene has the power to shift human perception of ecological identities. Humanness is a history of narratives and identities – a landscape of interpretations that we give to ourselves, that change over time and in result of dominant power structures. We are an invention of our own making. Who we are depends on who we intend to be and who perceives us. We change depending on the room we are in and the time of day. Each and every part of our lived experience comes at us with the history of time tumbling behind it – every object, every idea, every circuit, every drop of water, a living signal flow of information.[23]

22 Radical geography entails the use of unorthodox and unconventional ways of mapping and organizing space. It also reminds me of the visibility of forgotten and obscured narratives.

23 It's rather extraordinary to think that we are made out of the same atomic and molecular material as light, but just organized differently.

The Mighty Kongbot Inc.
(Dom Barra & Luigi Console)
Author

Anti-Anthropocalyptic Set
Project

2016
Year

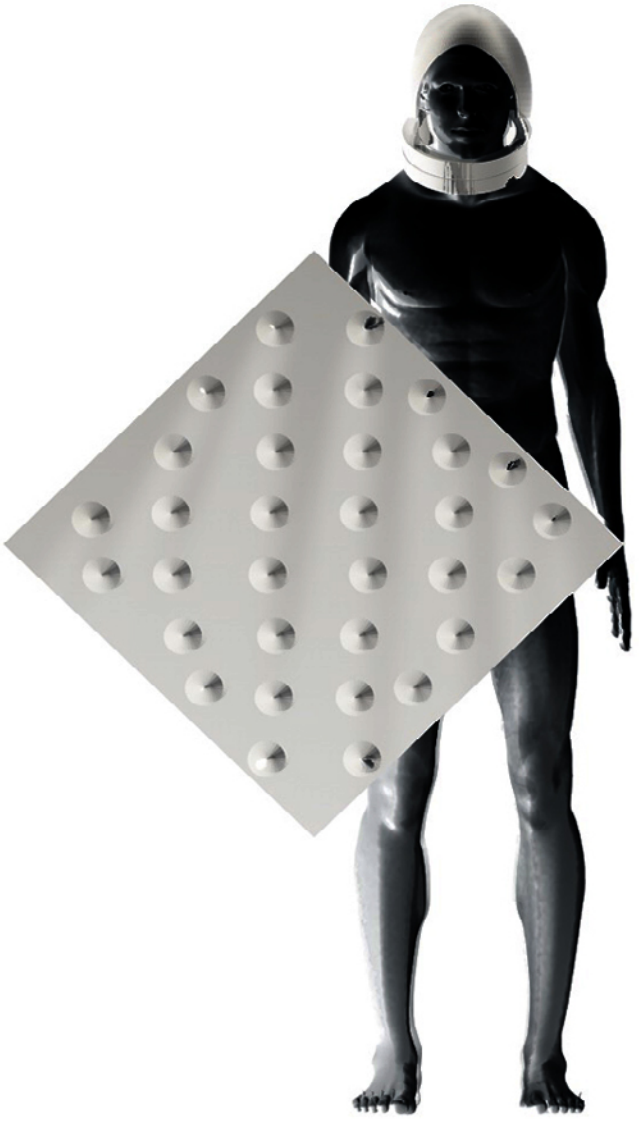
#toolkit
Format

#futures
Theme

#remesh
Action

Three tools for surviving apocalyptic scenarios

ANTI-ANTHROPOCALYPTIC SET



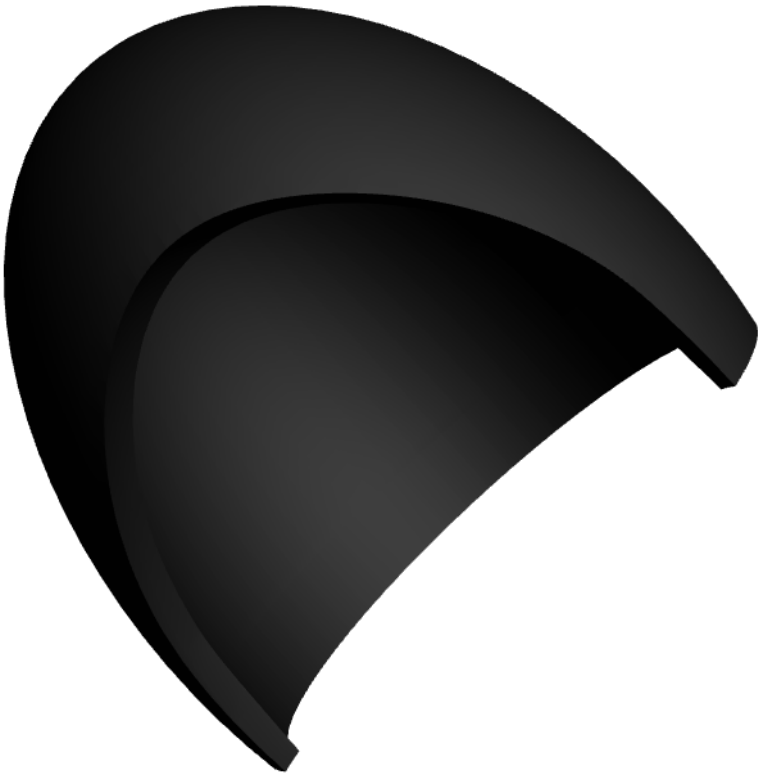
The Mighty Kongbot Inc. set for surviving the *Anthropocene* is a kit you can 3D print at home and that can help you survive apocalyptic scenarios. It is very handy and will help you to save your own life, the love of your life, and the lives of those dear to you. The Solar System is disintegrating, the Earth is drying out and the poles are melting. The human mind is poisoned as much as the water we drink, the food we eat, the air we breathe, the soil we work and walk. Make up your mind quickly, time is running out. So, let us introduce the *Anti-Anthropocalyptic Set*.

MIGHTY KØNGBØT

1) Anti-Beheading Collar:

When in war you don't need to get crazy from the fear to lose your head. People are going mental; stupidly dangerous. Recent studies prove that blades such as knives, swords, katanas and machetes are available everywhere, you can find a knife even in your own kitchen: you could be killed with your own blade! We say 'Fuck that'! If either a terrorist or your neighbors or your friends or relatives are plotting against you, you need to have your head on your neck to fight back. So, before a maniac turns you into a war-crime/hunting trophy, print the *Anti-Beheading Collar* and put it around your family's necks. Be the hero to your kids, be a prince to your spouse.

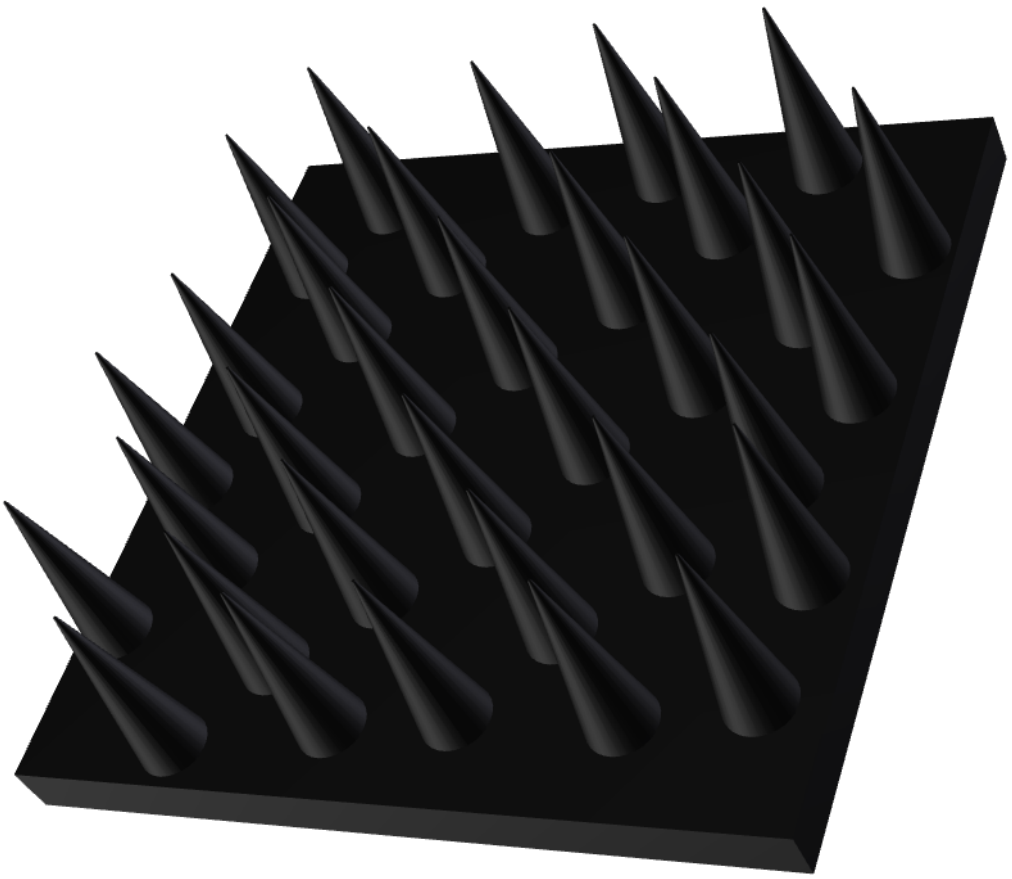
MIGHTY KØNGBØT



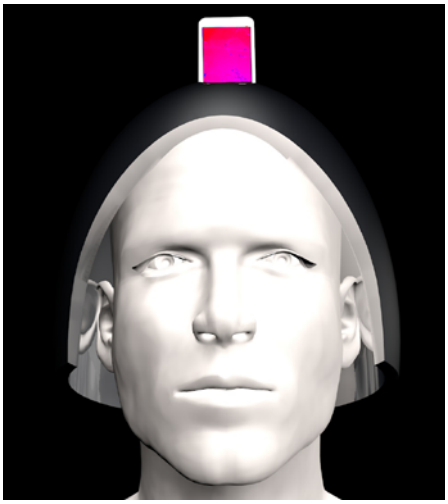
2) Anti-Asteroids and Space Waste Helmet:

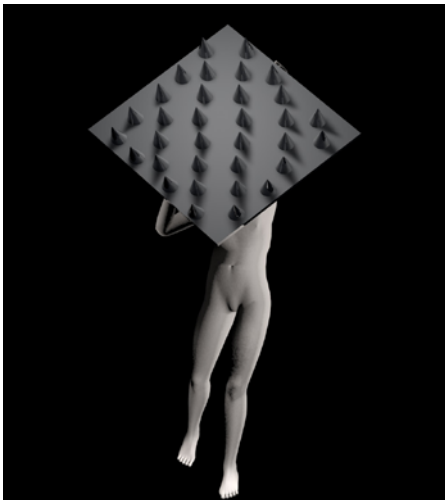
Do you think that what we put in space is going to be there forever? Do you think before the solar system starts to crumble and fall from the sky heaven is going to WhatsApp you and say ‘hey mate, take care of yourself and your family. It’s going to fall space trash and stones in a bit...’. Do you believe it is going to be like that? Probably you do, but we don’t so trust us, believe in us. Recent studies have proved that things are bad, so bad that you can’t handle such badness and we did it for you. You know what it feels like to be hit on the head while you are shopping in the vicinity of a satellite? No, you don’t. You know what it feels like to picnic with your family and suddenly your kids get hit on the head by a plummeting asteroid? No, you don’t, and how could you? The end of the world is not here yet, but your defense is. This tool will save your shopping, this tool will save your picnic. Your family will love you forever. And there is more. You probably wish to check your Facebook updates for a last time, WhatsApp your work mates and wish them a good end, tweet all of the steps of your great escape, or put on Instagram a divine selfie of you saving your life and family so, we included a smartphone holder in this helmet where you can stick your priceless device so that you know where your dear phone is all of the time. We know that you care about your smartphone as much as you care about your head, your iPhone is the extension of your mind so we made this brilliant combination just for you, thanks us later, go to print it.

MIGHTY KØNGBØT



3) Anti-Earthquake Shield:
Under our feet there is a bomb. Not asphalt, nor grass but pure explosive. Any time this bomb can detonate itself, the soil under our feet will crumble like cookie dough making the world above our heads fall like deadly rain. Balconies, windows and window glass, flower pots, air conditioners, hot water heaters, staircases, elevators, TV antenna, rubbish and human corpses, everything will turn into a cannon ball shot at you from the gravity army. You will be buried under tons of sh!t and die, all of your family dead and buried under tons of human sh!t. If that sounds like sh!t, it's time to be more fond of your life and that of your family and get ready to protect them because when that bomb explodes your future and that of your family will only depend on you, and only you can be the man or woman of the hour. The shield will protect you from being hit in the stomach, legs, arms, back during your escape towards a new life while the whole world falls into pieces at your feet.





ANTI-
ANTHROPOCALYPTIC
SET

EVENTS LIKE THESE CAN HAPPEN ALL AT THE SAME TIME, SO WE ADVISE YOU TO PRINT OUR TOOLS AS SOON AS YOU CAN, ONE FOR EACH MEMBER OF YOUR FAMILY. USE THIS KIT ACCORDING TO THE MOST URGENT NECESSITY AND YOU MAY JUST MANAGE TO SURVIVE THE ANTHROPOCALYPSE.

YOUR FELLOW HUMANS HAVE BROUGHT THESE DISASTERS UPON YOU WITH THEIR AIMLESS ENJOYMENTS AND MINDLESS BEHAVIORS. BE AS COLD BLOODED AS THEY WERE AND THINK FOR YOURSELF.

YOU ARE THE SUPER HUMAN WITH THE MIGHTY KONGBOT INC. – ANTI-ANTHROPOCALYPSE SET!

3D PRINT YOUR INSTRUMENTS OF ALMIGHTINESS!

NEVER GIVE UP! NEVER STOP DREAMING! EVEN DURING THE ANTHROPOCENE!

SALUTE FROM THE MIGHTY KONGBOT INC.

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The seed for this project was planted in February 2014 at a party at Tritriangle, Chicago, over drinks and new media art. In March 2015 we published *The 3D Additivist Manifesto*, relying on our tentacular social media reach to get the word out. The response was profound, propelling us forward with a momentum that has yet to dissipate. We have read and reacted, collected and contemplated, compiled documents and presentations, been interviewed, travelled, talked, lectured, held workshops, sent emails (oh so many emails) and met an astounding number of people without whom nothing you see here would have been possible. We want to thank everyone who has touched our lives and this project over the last three years and made this journey so meaningful. Every work contained in this Cookbook has its own story to tell, and it is to the artists, makers, thinkers, activists and writers whose ideas fill this volume that we owe the biggest thanks. We consider the publication of *The 3D Additivist Cookbook* as merely the beginning.

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